





# **Transmission and Distribution Losses in GEB System corresponding to 2000-01**

**Volume 2 Annexure**

*Prepared for*     **Gujarat Electricity Board**

**TERI Project Report No. 2000ER67**



## Minutes of the meeting held on September 6, 2000 at TERI for T&D loss estimation in Gujarat

The following persons attended the meeting

1. Mr R K Sharma, Member GERC, Ahmedabad
2. Mr. P N Upadhaya, Chief Engineer (RE) GEB, Vadodra
3. Mr K Ramanathan, TERI
4. Mr M S Bhalla, TERI
5. Mr. Gaurav Bhatiani, TERI
6. Mr. Shahid Hasan, TERI
7. Mr. Rahul Mishra, TERI
8. Mr. C Anjanappa, TERI

Initiating the discussions Mr. Bhalla traced the history of the T & D proposal submitted by TERI to GEB on September 1999 and explained the scope of the proposed revised study based on the discussions held with GEB in April, June and July 2000.

Mr. Sharma enquired the reasons for delay in initiating the study. Mr. Upadhaya explained that the decision to estimate the T & D losses in GEB by an independent agency was only taken in June 2000 . Based on the discussions held in July 2000, GEB selected 30 feeders (6 feeders in each of the five zones of the State, comprising, 2 rural , 2 urban and 2 industrial feeders) to be completed in a period of 9 months at a total cost of Rs. 37 lakhs. This Proposal has already been forwarded to Chairman GEB for approval. On a query by Mr. Sharma about the total number of feeders in the state, it was indicated that 30 feeders worked out to be less than 1% of the total number of feeders in the state. Mr. Sharma, member GERC therefore proposed that the total number of feeders to be studied should be about 1% and more emphasis be laid on agricultural feeders. In view of this, 44 feeders were identified from all the categories. The details are enclosed in the table below.

Table: Details of feeders identified in each category

Feeders	Total number of feeders	Number of feeders selected
EHT	142	2
HT	295	4
Industrial	534	6
GIDC (industrial estates)	168	
Urban	725	7
Rural	2668	25
<b>Total</b>	<b>4532</b>	<b>44</b>

Mr. Sharma had also proposed that the feeder's selection should be done jointly by TERI and GEB

There after Mr. Sharma indicated that GERC has already suggested to GEB to also correctly assess the energy consumption in the unmetered agricultural supply. He therefore, suggested to include the estimation of the unmetered agricultural energy consumption as a part of the study. Since this consumption will have a bearing on the T & D loss estimation.

The issue was discussed in detail and the following terms of reference were agreed to jointly by GERC GEB & TERI.

1. The scope of the present study should be enlarge to cover above mentioned 44 feeders.
2. As already proposed by TERI GEB should install digital meters at all the Distribution Transformers in the all the 44 feeders.
3. GEB should also install digital meters at the individual agriculture consumers where the resistance to its installation is not there.
4. GEB has already installed about 10000 individual meters for *Tatkal Scheme* for agricultural connections and GWRDC has also installed meters for agricultural connections. These meter readings should be taken into consideration for detailed estimation of agricultural consumption.
5. TERI should ensure that all the panel meters are calibrated by GEB before starting the work.
6. The representative feeder would be identified jointly by GEB & TERI based on the connected load ect., under each category.
7. The maximum time spent for completing the study will be one year from the date of initiation of the study.
8. The zero date for the study will be the date of confirmation from GEB regarding installation of digital meter at all the Distribution Centres of the identified feeder at least in one zone of the state.
9. In order to avoid any further delay in awarding the work to TERI GERC suggested that only additional cost and time for carrying out the study due to above mention enlarged scope be now indicated by TERI.
10. The revised estimate of the cost of the study would be about 50 lacks and the same was conveyed by Mr. Sharma, Member GERC to Mr Srivastava, Member Finance of GEB on telephone.
11. Every month or at least quarterly in a year, TERI should give feedback about the status of the project to the Commission
12. The methodology for estimation of T&D losses remains the same as has been proposed by TERI in their revised proposal submitted to GEB.
13. GERC suggested that every effort should be made by GEB to expedite the issue of letter of award to TERI so as to avoid any further delay in the commencement of the study.

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## Section 1

# **EHT Network Annexure**





## **Transmission System (Network 66 kV and above)**

- ⇒ *One Line Diagram of the 220 kV Mehsana Grid Network*
- ⇒ *One Line Diagram of the 220 kV Vav Grid Network*
- ⇒ *One Line Diagram of the 220 kV Icchapore Grid Network*
- ⇒ *Energy Sent, received and Losses in the Network (Mehsana Grid Sample Case)*
- ⇒ *Energy Sent, received and Losses in the Network (Vav and Icchapore Grid Sample Case)*
- ⇒ *Summary of Losses Report*
- ⇒ *Categorization of Zones*



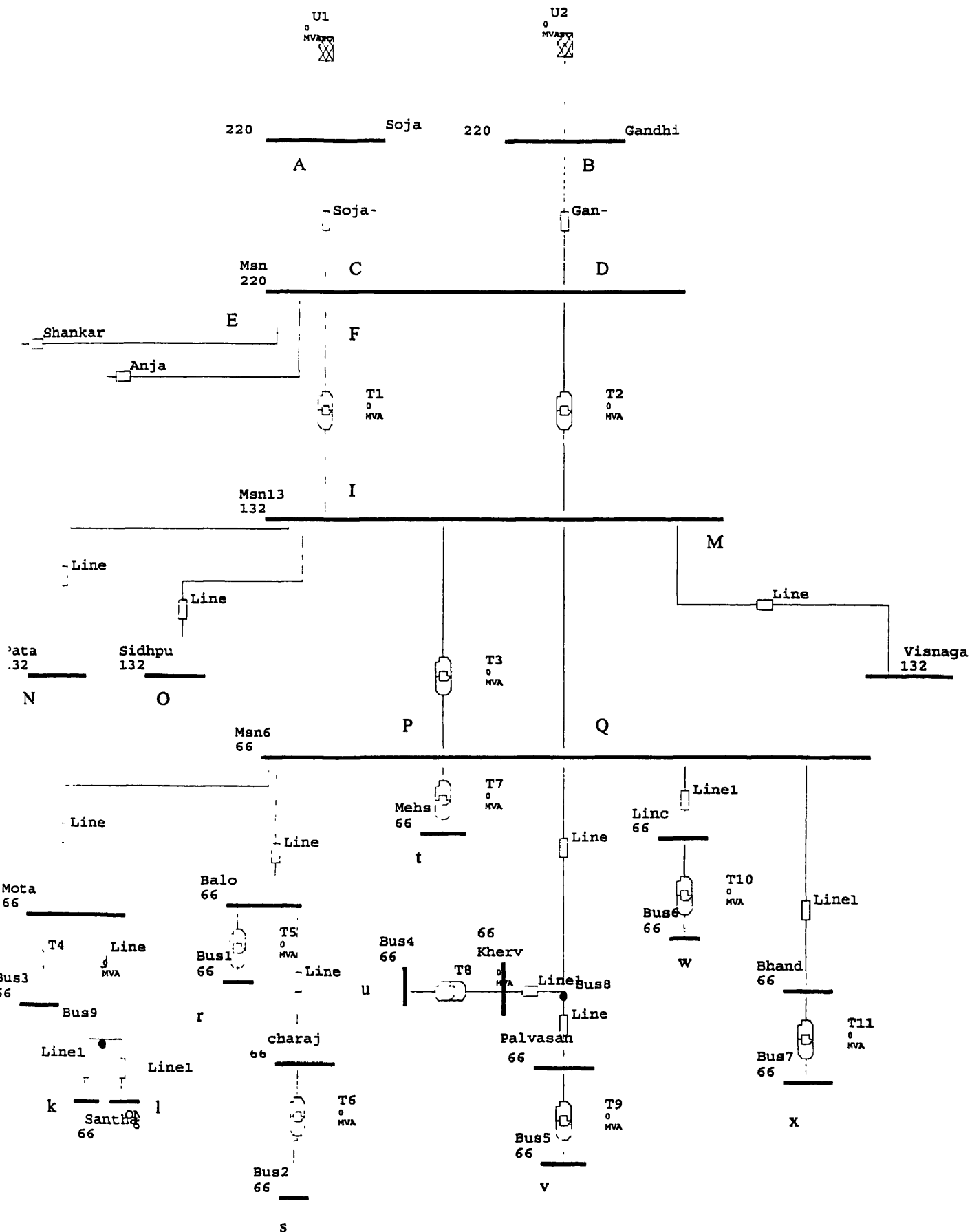
### Capacity of 66/22/11 kV sub-stations fed by Vav & Ichhapore

Name of the Grid Sub-station	Name of the 66/22/11 kV sub-stations	Pri/Sec voltage	Capacity in MVA
Vav	1. Kadodara	66/22	$1 \times 15 + 2 \times 10 = 35$ MVA
	2. Palsana	66/22	$2 \times 15 = 30$ MVA
	3. Bardoli	66/22	$2 \times 10 + 1 \times 15 = 35$ MVA
	4. Sarthana	66/22	$2 \times 10 = 20$ MVA
	5. Mandavi	66/11	$2 \times 10 = 20$ MVA
	6. Zankhvav	66/11	$2 \times 5 = 10$ MVA
	7. Tapi	66/22	$4 \times 15 = 60$ MVA
Ichhapore	8. Olpad	66/11	$1 \times 5 + 2 \times 10 = 25$ MVA
	9. Variav	66/11	$1 \times 15 + 1 \times 10 = 25$ MVA
	10. Ichhapore	66/11	$1 \times 15 + 1 \times 10 = 25$ MVA

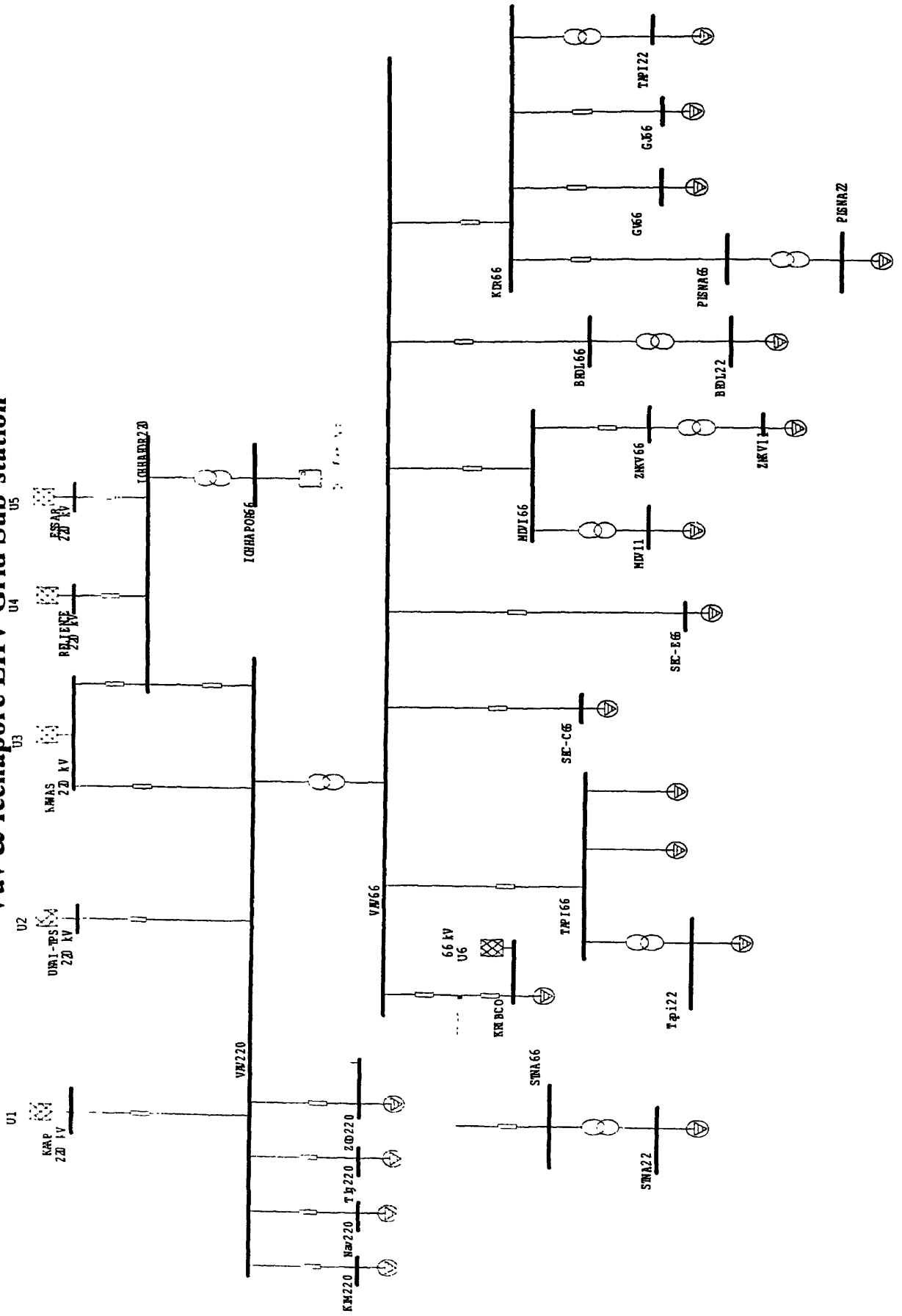
### Capacity of 66/22/11 kV sub-stations fed from Mehsana

Grid Sub-station	Name & capacity of 66/22/11 kV sub-station	
400 MVA, 220/132 kV & 100 MVA, 220/66 kV Mehsana	1. Basana	2x15 = 30 MVA
	2. Dhinoj	2x10 =20 MVA
	3. Balol	2x10 =20 MVA
	4. Bandhu	2x10 =20 MVA
	5. Linch	2x5 =10 MVA
	6. Palavasana	3x10=30 MVA
	7. Kherva	2x10 =20 MVA
	8. Becharaji	2x10 =20 MVA
	9. Modhera	2x10 =20 MVA
	10. Motap	2x10 =20 MVA
	11. Jotana	2x10 =20 MVA

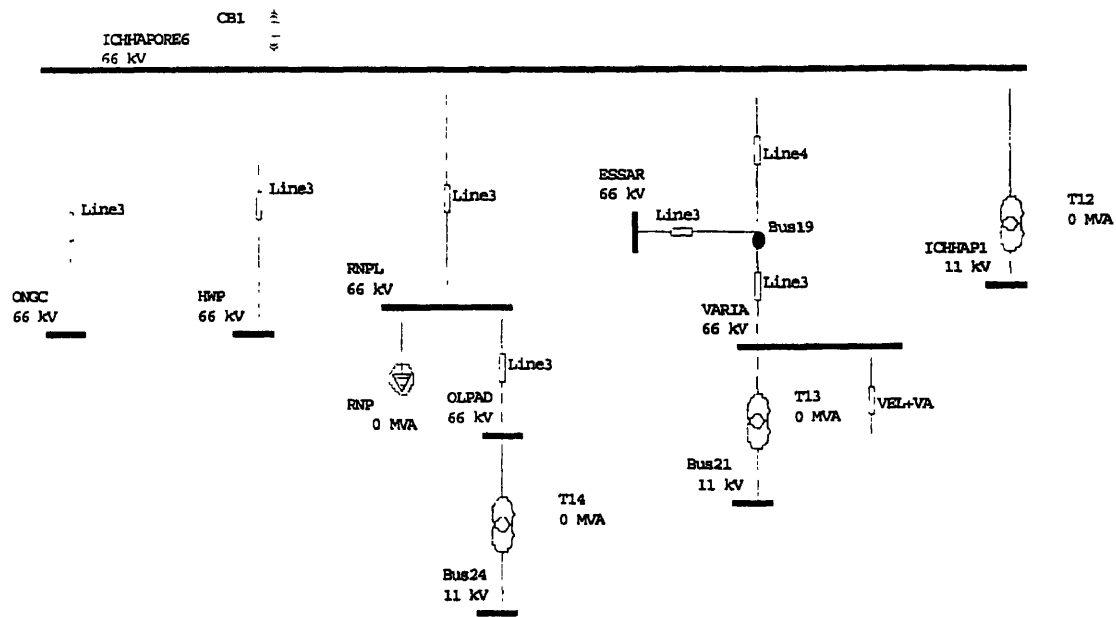
# Single Line Diagram of Mehsana 220 kV Network



## Vav & Iechapore EHV Grid Sub-station



## Ichhapore 66 kV Single Line Diagram







**ENERGY RECEIVED AND SENT OUT IN MEHSANA CIRCLE DURING THE PERIOD APRIL-1999 TO NOV-2000**

Energy: all in MU (Million Units)

Period	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	01-Jan	01-Feb	01-Mar
<b>Energy sent to 220 kV Mehsana from</b>												
Soja	228.6	228.6	164.8	106.7	113.0	176.6	219.6	202.0	196.8	197.9	182.9	186.8
Gandhi Nagar	179.9	179.9	128.1	81.6	92.0	150.9	183.8	178.6	175.2	169.7	150.7	157.9
	408.4	408.4	292.9	188.3	205.0	327.4	403.5	380.6	372.0	367.6	333.6	344.7
<b>Energy Received at 220 kV Mehsana from</b>												
Soja	209.1	203.0	156.0	104.6	111.6	173.6	206.4	190.7	183.9	185.1	174.3	182.2
Gandhi Nagar	161.0	158.8	113.7	69.9	87.6	130.1	158.5	153.8	150.9	146.2	130.9	145.7
	370.1	361.7	269.8	174.5	199.2	303.7	364.9	344.4	334.8	331.3	305.2	327.9
<b>Energy sent out from Mehsana 220 kV to</b>												
Anjar	102.8	86.5	75.5	52.6	56.8	85.1	99.2	97.2	96.3	94.1	84.9	96.1
Sankhari	109.1	102.5	70.4	45.7	51.6	87.1	104.0	102.9	92.3	85.5	76.7	80.8
220/132 kV Trf. (Primary)	123.0	159.5	114.0	44.2	53.1	100.5	127.6	114.3	114.7	120.8	113.5	120.5
220/66 kV Trf. (Primary)	28.5	30.0	21.9	13.9	15.1	18.5	23.1	21.1	21.7	20.8	21.6	257.6
<b>Energy Received from 220 kV Mehsana at</b>												
220/132 kV Trf. (Secondary)	124.8	129.2	91.5	49.8	50.7	102.9	128.9	115.4	116.3	121.8	118.9	131.1
220/66 kV Trf. (Secondary)	28.5	30.0	21.9	13.9	15.1	18.5	23.1	21.1	31.8	31.5	27.6	327.6
<b>Energy sent out from Mehsana 132 kV to</b>												
Sidpur Feeder 1+2	62.8	64.6	41.4	21.3	27.7	45.4	57.5	52.3	53.7	56.6	57.8	69.1
Patan	43.2	47.9	28.3	35.2	15.5	43.3	44.3	44.0	42.6	45.8	43.7	43.5
Visnagar	1.2	0.1	10.4	6.0	2.5	10.5	7.0	0.2	0.0	0.4	2.0	0.0
132/66 kV Trf. (Primary)	15.2	14.7	9.7	3.7	8.3	15.8	18.2	17.6	18.0	18.8	15.5	150.2
<b>Energy Received from Mehsana 132 kV at</b>												
Sidpur Feeder1	26.0	27.8	17.7	9.2	11.7	1.7	24.2	20.8	21.4	22.8	24.0	27.0
Sidpur Feeder2	38.9	36.9	23.2	12.3	15.7	2.5	32.5	29.3	30.9	32.8	32.3	30.4
Patan 1	21.1	23.3	14.0	5.6	7.1	1.3	21.4	22.0	19.0	33.3	21.0	21.2
Patan 2	21.2	23.7	14.1	7.5	7.0	1.4	22.2	21.1	20.5	22.4	21.3	21.6

Vlsnagar	1.3	0.1	11.4	5.8	2.3	11.7	7.5	5.8		1.8	0.0
132/66 kV Trf. (Secondary)	15.4	14.4	9.6	3.7	8.1	16.2	18.4	17.7	18.2	18.2	151.6
<b>Energy sent from Mehsana 66 kV to</b>											
Motap	10.6	5.0	4.6	3.4	3.5	4.9	5.3	5.3	5.5	6.1	5.1
Balol	13.2	19.8	10.4	7.7	13.2	22.5	12.8	12.2	12.8	12.5	9.8
Mehsana 66/11 Trf.	8.7	9.3	8.2	7.0	7.3	7.7	8.2	7.4	6.8	6.7	6.3
Kherva-Palavasana	4.7	13.0	11.4	8.1	8.4	11.3	13.3	12.2	13.0	12.4	11.1
Linch	3.4	9.0	5.4	2.7	3.5	6.5	7.8	7.5	7.6	7.8	7.8
Bhandu	8.0	3.1	2.2	0.7	1.4	2.8	4.3	3.7	3.8	3.9	3.4
Basana	0.1	0.1		0.3		0.0		0.1	0.0	0.0	0.0
<b>Energy Received from 66 kV Mehsana at</b>											
Motap	5.0	5.2	4.8	8.5	3.6	5.0	5.5	5.5	5.6	6.3	5.2
Balol	10.4	9.6	5.2	3.4	6.6	11.2	12.9	12.4	12.6	12.3	10.2
Kherva	5.0	5.4	4.2	1.7	1.9	3.4	8.3	4.5	4.7	4.6	4.0
Palavasana	8.2	8.5	7.4	6.2	6.6	8.0	8.3	7.7	8.3	7.8	7.1
Linch	7.8	8.4	5.3	2.4	3.2	6.2	7.4	7.1	7.5	7.7	6.7
Bhandu	3.8	3.3	2.2	4.6	1.3	2.6	4.3	3.6	3.7	3.8	3.3
Motap											
<b>Energy sent to</b>	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motap 66/11 kV Tr Primary	1.3	1.2	1.0	5.7	0.9	1.9	2.4	2.3	2.3	2.2	1.7
ONGC	3.6	4.0	3.7	2.8	2.6	3.0	3.1	3.2	3.3	4.1	3.5
<b>Energy Received at</b>											
Motap 66/11 kV Tr Secondary	1.2	1.1	0.9	5.6	0.9	1.9	2.3	2.3	2.3	2.2	1.9
ONGC 1(Santhal)	2.1	2.4	2.1	1.5	1.6	1.6	1.6	1.5	1.7	1.9	1.7
ONGC 2 (Balol)	1.5	1.6	1.6	1.3	1.0	1.4	1.5	1.6	1.7	2.2	1.7
Auxiliary consumption at 66/11 KV Motap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Energy sent out from Motap at 11 kV</b>	1.2	1.1	0.9	5.6	0.9	1.9	2.3	2.3	2.3	2.2	1.9



<b>Energy sent out from Kherva at 11 kV</b>	5.0	5.4	4.1	1.7	1.9	3.3	8.1	4.5	4.6	4.5	4.0	4.7
<b>Palvasana</b>												
<b>Energy Sent to Palvasana</b>												
Palvasana 66/11 kV Tr Primary	8.2	8.5	7.4	6.2	6.6	8.0	8.3	7.7	8.3	7.8	7.0	8.2
<b>Energy Received at</b>												
Palvasana 66/11 kV Tr Secondary	8.2	8.5	7.3	6.2	6.6	8.0	8.3	7.7	8.2	7.7	7.0	8.2
Auxiliary consumption at 66/11 KV Palvasana	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Energy sent out from Palvasana at 11 kV</b>	8.2	8.5	7.3	6.2	6.6	8.0	8.3	7.7	8.2	7.7	7.0	8.2
<b>linch</b>												
<b>Energy Sent to Linch</b>												
Linch 66/11 kV Tr Primary	7.8	8.4	5.3	2.4	3.2	6.2	7.4	7.1	7.5	7.5	6.8	7.6
<b>Jothana</b>												
<b>Energy Received at</b>												
linch 66/11 kV Tr Secondary	7.8	8.4	5.1	2.4	2.8	6.1	7.2	7.1	7.4	7.4	6.8	7.6
Auxiliary consumption at 66/11 KV Linch	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Energy sent out from Linch at 11 kV</b>	7.8	8.4	5.1	2.4	2.8	6.1	7.2	7.1	7.4	7.4	6.8	7.6
<b>Bhandu</b>												
<b>Energy Sent to Bhandu</b>												
Bhandu 66/11 kV Tr Primary	3.8	3.3	2.2	4.6	1.3	2.6	4.3	3.6	3.7	3.8	3.4	3.3
<b>Energy Received at</b>												
Bhandu 66/11 kV Tr Secondary	3.7	3.2	2.0	4.5	0.8	2.4	4.4	3.4	3.8	3.8	3.1	3.0
Auxiliary consumption at 66/11 KV Bhandu	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Energy sent out from Bhandu at 11 kV</b>	3.7	3.2	2.0	4.5	0.8	2.4	4.4	3.4	3.8	3.8	3.1	3.0

**ENERGY RECEIVED AND SENT OUT IN MEHSANA CIRCLE DURING THE PERIOD APRIL-1999 TO NOV-2000**

Energy all in MU (Million Units)

Period	Before Correction	After Correction factor
<b>Energy sent to 220 kV Mehsana from</b>	<b>Annual energy</b>	<b>Net Energy</b>
Soja	2204.1	2203.7
Gandhi Nagar	1828.3	1788.1
	4032.4	3991.7
<b>Energy Received at 220 kV Mehsana from</b>		
Soja	2080.5	2132.3
Gandhi Nagar	1607.1	1606.8
	3687.6	3739.0
<b>Energy sent out from Mehsana 220 kV to</b>		
Anjar	1027.0	1060.1
Sankhari	1008.5	991.5
220/132 kV Trf (Primary)	1305.7	1307.6
220/66 kV Trf (Primary)	493.9	503.6
<b>Energy Received from 220 kV Mehsana at</b>		
220/132 kV Trf (Secondary)	1281.4	1272.2
220/66 kV Trf (Secondary)	590.6	587.9
<b>Energy sent out from Mehsana 132 kV to</b>		
Sidpur Feeder 1+2	610.2	624.1
Patan	477.2	477.3
Visnagar	40.3	43.4
132/66 kV Trf (Primary)	305.5	305.5
<b>Energy Received from Mehsana 132 kV at</b>		
Sidpur Feeder 1	234.2	245.9
Sidpur Feeder 2	317.8	333.7
Patan 1	210.3	219.4
Patan 2	204.0	194.8
Visnagar	47.7	47.7
132/66 kV Trf (Secondary)	309.6	296.5
<b>Energy sent from Mehsana 66 kV to</b>		
Motap	64.4	64.4
Balol	157.1	157.1
Mehsana 66/11 Trf	89.8	83.0
Kherva-Palavasana	120.3	120.3
Linch	76.0	76.0
Bhandu	40.6	40.6
Basana	0.6	0.6
<b>Energy Received from 66 kV Mehsana at</b>		
Motap	61.7	61.7
Balol	111.1	111.1
Kherva	52.3	52.3
Palavasana	92.2	92.2
Linch	77.1	77.2
Bhandu	39.8	39.8
Motap		
<b>Energy sent to</b>		
Motap 66/11 kV Tr Primary	24.7	23.5
ONGC	38.6	38.6
<b>Energy Received at</b>		
Motap 66/11 kV Tr Secondary	24.2	24.2
ONGC 1 (Santhal)	22.5	22.5
ONGC 2 (Balol)	19.9	19.9
Auxiliary consumption at 66/11 KV Motap	0.0	0.0
<b>Energy sent out from Motap at 11 kV</b>	24.2	24.2
Balol		
<b>Energy sent to</b>		
Balol 66/11 kV Tr Primary	45.8	45.4
Becharaji	70.2	70.2
<b>Energy Received at</b>		
Balol 66/11 kV Tr Secondary	45.8	45.8
Becharaji	69.7	69.7

Auxiliary consumption at 66/11 KV Balol	0.0	0.0
<b>Energy sent out from Balol at 11 kV</b>	<b>45.8</b>	<b>45.8</b>
<b>Becharaji</b>		
<b>Energy Sent to</b>		
Becharaji 66/11 kV Tr Primary	69.9	69.9
<b>Energy Received at</b>		
Becharaji 66/11 kV Tr Secondary	67.8	67.8
Auxiliary consumption at 66/11 KV Becharaji	0.0	0.0
<b>Energy sent out from Becharaji at 11 kV</b>	<b>67.8</b>	<b>67.8</b>
<b>Mahasana</b>		
<b>Energy Sent to Mahasana</b>		
Mahasana 66/11 kV Tr Primary	85.0	89.7
<b>Energy Received at</b>		
Mahasana 66/11 kV Tr Secondary	85.1	85.1
Auxiliary consumption at 66/11 KV Mahasana	0.1	0.1
<b>Energy sent out from Mahasana at 11 kV</b>		
<b>Kherva</b>		
<b>Energy Sent to Kherva</b>		
Kherva 66/11 kV Tr Primary	52.3	52.8
<b>Energy Received at</b>		
Kherva 66/11 kV Tr Secondary	51.7	51.7
Auxiliary consumption at 66/11 KV Kherva	0.0	0.0
<b>Energy sent out from Kherva at 11 kV</b>	<b>51.7</b>	<b>51.7</b>
<b>Palvasana</b>		
<b>Energy Sent to Palvasana</b>		
Palvasana 66/11 kV Tr Primary	92.1	94.9
<b>Energy Received at</b>		
Palvasana 66/11 kV Tr Secondary	91.8	91.8
Auxiliary consumption at 66/11 KV Palvasana	0.0	0.0
<b>Energy sent out from Palvasana at 11 kV</b>	<b>91.8</b>	<b>91.8</b>
<b>Linch</b>		
<b>Energy Sent to Linch</b>		
Linch 66/11 kV Tr Primary	77.1	78.6
<b>Energy Received at</b>		
Linch 66/11 kV Tr Secondary	76.0	76.0
Auxiliary consumption at 66/11 KV Linch	0.0	0.0
<b>Energy sent out from Linch at 11 kV</b>	<b>76.0</b>	<b>76.0</b>
<b>Bhandu</b>		
<b>Energy Sent to Bhandu</b>		
Bhandu 66/11 kV Tr Primary	39.9	39.9
<b>Energy Received at</b>		
Bhandu 66/11 kV Tr Secondary	38.1	38.1
Auxiliary consumption at 66/11 KV Bhandu	0.0	0.0
<b>Energy sent out from Bhandu at 11 kV</b>	<b>38.1</b>	<b>38.1</b>

## Loss summary

Total energy loss						
	Actual		Corrected		Corrected (After applying technical factor)	Remark
		%		%		
Elements	Absolute MU	own base	Absolute MU	own base	Absolute MU	
Soja lines	123.64	5.61%	71.40	3.24%	11.24	@#
Gandhinagar lines	221.21	12.10%	181.31	10.14%	11.62	@#
200/132	24.37	1.87%	35.33	2.70%	35.33	@
220/66	-96.68	-19.57%	-84.28	-16.74%	2.01	@#
Patan	58.24	9.54%	44.56	7.14%	44.56	@
Sidhpur	62.88	13.18%	63.08	13.22%	9.07	@#
Visnagar	-7.34		-4.26			
132/66	-4.03	-1.32%	9.07	2.97%	9.07	@
Mehsana-Motap	2.64	4.10%	2.64	4.10%	2.64	
Mehsana-Balol	41.12	26.17%	41.50	26.41%	6.49	@#
Mehsana-kherva	-24.18	-20.11%	-24.18	-20.11%	3.44	@#
Mehsana-linch	-1.08	-1.43%	-1.21	-1.59%	1.07	@#
Mehsana-Bhandu	0.83	2.04%	0.83	2.04%	0.83	
Motap-ONGC	-3.68	-9.53%	-3.68	-9.53%	0.10	#
Balol-Becharaji	0.32	0.45%	0.32	0.45%	0.32	
Motap	0.55	2.22%	-0.73	-3.12%	0.55	
Balol	-0.02	-0.04%	-0.40	-0.88%	0.23	@#
Becharaji	2.07	2.96%	2.07	2.96%	2.07	
Mehsana	-0.07	-0.08%	4.59	5.12%	4.59	@
kherva	0.60	1.14%	1.08	2.05%	1.08	
Palavasana	0.30	0.33%	3.07	3.23%	3.07	@
Linch	1.09	1.41%	2.63	3.34%	2.63	@
Bhandu	1.75	4.39%	1.75	4.39%	1.75	
Total Loss	404.53		346.47		153.76	
Legend	@	Correction factor were applied				
	#	Technical loss considered due to higher loss				
	@#	Both technical as well as correction factor were applied				





ENERGY RECEIVED AND SENT OUT IN VAV & ICHHAPORE 220 kv S/S FROM APRIL-2000 TO March-2001													
All in MWH	Period	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
Energy sent to 220 kv Vav from													
Ukai TPS 1		37050	35540	54470	55930	39650	40670	41290	56570	55390	54870	41610	32140
Ukai TPS 2		39000	36280	57927	65560	42160	39840	39000	57400	54120	54416	36760	22680
Ukai TPS 1+2		76050	71820	112397	121490	81810	80510	80290	113970	109510	109286	78370	54820
Kawas		90115	90592	65435	74240	88890	92979	75301	61945	66554	69212	68526	81928
KAPP 1		47766	33622	35862	30105	41923	45059	51219	11414	40253	40460	32310	46419
KAPP 2		41850	36070	35062	29870	40520	45260	51058	10918	50172	35760	31340	45932
KAPP 1+2		89616	69692.4	70924	59975	82443	90319	102277	22332	90425	76220	63650	92351
Ichhapore		67209.6	70207.2	49567.2	47726.4	72684	74668.8	66928.8	51266	48432	50885	48698	61180
Navsari		384	88	120	0	8	355	48	16	56	0	24	592
Talangpore		92	0	0	0	0	8	8540	0	0	0	0	284
Zagadia		4748	19060	18464	15072	6054	556	8540	24356	13604	8652	20380	9912
Kim		444.7	396	186	947	113	0	11.8	105	32	355	609	399
Total energy sent to Vav		328660	321856	317093	319450	332002	339396	341937	273990	328613	314610	280267	301466
Energy Received at 220 kv Vav from													
Ukai TPS 1		36876	35052	53680	54271	39866.4	40828	39984	57466	55478	57319	43805	33300
Ukai TPS 2		35648	33368	49664	56784	38920	38472	37976	57162	56372	57142	41438	29075
Ukai TPS (1+2)		72524	68420	103344	111055	78786.4	79300	77960	114628	111850	114461	85243	62375
Kawas		89152	89940	65092	73582	87656	91448	74194	61426	66106	68770	67810	80608
KAPP 1		46828	33148	35296	29740	41432	44472	50496	11216	39892	39988	31928	45424
KAPP 2		40704	34553	33718	28573	38624	43187	48787	10413	47667	34006	30694	43948
KAPP (1+2)		87532	67701	69014	58313	80056	87659	99283	21629	87559	73994	62622	89372
Ichhapore		67318	70216.8	49456.8	47796	73020	74314	66638	51119	48384	50760	48530	56692
Navsari		416	88.72	132.48	2	4.8	320	59.04	15.36	75.12	0.48	25	159.6
Talangpore		91.2	0	0	0	0	2.4	8332.8	0	0	0	0	93.6
Zagadia		4603	19570	18033.6	14788.8	5906.4	532	8332.8	23899	13243	8652	20380	9912
Kim		472.8	432	196.8	1286.4	120	0.48	14.4	108	9.6	403	665	220
Total energy Received at Vav		322109	316368.5	305269.7	306823.2	325549.6	333575.9	334814	272824.4	327226.7	3317040	286275	299432
Energy sent from 220 kv Vav to													

All in MWH												
Period	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
Kim	45516	27981.6	27292.8	19377.6	48488	69004	49749	28178	45427	38563	23650	28497
Talangpore	28244	50596	49896	54224	9552	21748	45596	35608	52356	51740	45644	46584
Zagadia	9674.7	619	153.6	960	6021	16903	3297	262	2755	5640	55	2594
Navsari	45363	64836	67400	76140	58858.3	32145	53627	44698	66343	67782	59015	49689
Ukai TPS 1	268.8	440	220	1516	2013	2750	542	2.4	360	31	214	988
Ukai TPS 2	192	456	192	1968	1488	2448	336	0	356	34	222	152
Ukai TPS (1+2)	461	896	412	3484	3501	5198	878	2.4	716	65	436	1140
Kawas	0	0	0	0	0	0	0	10	4	0	0	0
KAPP 1	3200	3298	566	262	0	0	0	350	2	0	246	0
KAPP 2	0	2360	518	300	0	0	0	330	2	0	224	0
KAPP (1+2)	3200	5658	1084	562	0	0	0	680	4	0	470	0
Ichhapore	22	2.4	144	2068.8	156	0	0	0.14	254.4	0	223	253.6
220/66 kV Trf. (Pri.)	18994	163168	158292	146524	199565	185610	175777	160734	166927	162822	128679	162281
Total energy received from 220 kV Vav at	322171	313167	304674	303340	326143	330608	328924	270173	334786	326612	258172	291039
Energy Received from 220 kV Vav at												
Kim	45189	27951	27250	18661	46553	68840	50968	28275	45403	38787	23836	30330
Talangpore	27809	49730	48962	53260	9405	21213	44697	35021	51449	50772	44830	43315
Zagadia	9836	632	164	984	6120	16968	3380	216	2768	5772	84	2736
Navsari	44616	64248	67800	76790	59760	33048	53736	44256	65760	66912	58869	56265
Ukai TPS 1	280	456	200	1520	2000	2720	520	0	360	40	240	1280
Ukai TPS 2	200	440	170	2080	1650	2600	440	0	250	10	140	730
Ukai TPS (1+2)	480	896	370	3600	3650	5320	960	0	610	50	380	2010
Kawas	0	0	0	0	0	0	0	15	6	0	0	0
KAPP 1	3200	3328	622	268.8	0	0	0	390	137.6	0	256	0
KAPP 2	0	2360	518	204.5	0	0	0	355	0	51.2	192	0
KAPP (1+2)	3200	5688	1140	473.3	0	0	0	745	137.6	51.2	448	0
Ichhapore	21.6	2.4	144	2056.8	158.4	0	0	0.16	256	0	225	156
220/66 kV Trf. (Secondary)	180779	151669	156695	141340	190661	163606	170492	155488	160564	151628	155112	153122
Aux. Consn.	57	38.54	46	44	59	57	58	48.23	50.79	50	49.52	56.9
Total energy received from 220 kV Vav at	319930.6	300816.4	302525	297165.1	316307.4	3308995	324233	264016.2	326953.6	331397.2	283784	287934

Period	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
<b>Energy sent from 66 kV Vav to</b>												
Kamrej			240	360								
Velenja+Variav	28	64	30	305	35						74	240
Kribco+Sarhana	3836	4849	3457	3800	4812	4279.8	4569	4220	4599.72	4598.82	4334.4	4803.58
Tapi	35680	29235	31483	24930	38626	39560	40382	43466	41448	39484	46116	45408
SEC-C sln.	46559	42261.2	42816	39904	44235	47893	47901	39626.7	38437.6	34875.9	35215.28	33281
SEC-E sln	42519	40540.6	41991.6	38529	40393	41248	38508	27926.28	31090.68	30794.1	30347	36211
Kadodra	24520	23880	23480	23560	24760	26100	26480	25640	26980	25300	23220	20300
Sachin A	0	200	200	760	0	0	0	1640	200			
Sachin B	0	320	160	600	0	0	0	1240		120	40	40
Bardoli	13095	9234	11988	7712	8334	10998	11313	9099	8591.8	10287	9792	10881
Mandvi	5880	5508	7849	5101	6645	6508	7106	6058.8	6170	6246	6300	7085
<b>Total energy sent from 66 kV Vav</b>	<b>172117</b>	<b>158092</b>	<b>163685</b>	<b>145561</b>	<b>167840</b>	<b>176587</b>	<b>176259</b>	<b>158917</b>	<b>157518</b>	<b>151706</b>	<b>155439</b>	<b>158249</b>
<b>Energy Received from 66 kV Vav at</b>												
Kamrej (Exp at Vav)	0	0	240	360	0	0	0	0	0	0	0	0
Velenja+Variav (Exp @ Vav)	28	64	30	305	35						74	240
Kribco (1+2)	196	1296	58.4	42.4	3.2	0	4	0	0.0032	114	30.8	0.8
Sarhana												
Tapi (1+2+3+4)	32340	25412	26730	20576	31946	37998	41804	43652	41882	39142.8	44792.8	46761
SEC-C sln. (1+2)	47124	43342	42548	39954	44524	48184	47880	40158	38536	34924	35274	36596
SEC-E sln (1+2)	42496	41938	40588	38678	40326	41212	38050	27988	31044	30752	30380	38267
Sachin - A (Exp at Vav)	0	200	200	760	0	0	0	1640	200	0	0	0
Sachin - B (Exp at Vav)	0	320	160	600	0	0	0	1240	0	120	40	40
Kadodra (1+2)	24371	23670	23270	23416	24517	25940	26280	25654	27179	25108	22998	19850
Bardoli	13464	11009	9055	6289	8608	9583.3	10137	8569.7	9600	8855	9262	11577
Mandvi	7611	7618	5584	4866	6260	5236	6862	6306	6298	6170	6306	7082
<b>Total Energy Received</b>	<b>167630</b>	<b>154865</b>	<b>148463</b>	<b>135846</b>	<b>156216</b>	<b>168153</b>	<b>171017</b>	<b>155208</b>	<b>154739</b>	<b>145166</b>	<b>149158</b>	<b>160412</b>
<b>Sarhana</b>												
<b>Energy sent/received from Sarhana 66 kV</b>												
66/22 kV Trf. (Pri.)												

All in MWH												
Period	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
66/22 kV Trf. (Sec)	3519.6	3670.8	3534	3750	4920	3990.8	3500	4332.6	4710	4602	4399	5196
Aux. Consn.	0.035	0.22	0.017	0.022	0.92	1.6	1.84	1.68	1.92	1.7	1.6	1.72
Energy sent on 22 kV feeders	3519.57	3670.58	3533.98	3749.98	4919.08	3989.20	3498.16	4330.92	4708.08	4600.30	4397.40	5194.28
Energy sent from Tapi 66 kV to												
Udhana	20490	13302	13048	10788.4	18266.4	21728	16060	20399.2	16538.4	16523	21593.6	15878.4
SEC-A stn.	178.4	164.5	1683.7	213.8	3287	548.5	7806.6	8566.5	9614	9109.7	8907	11483.4
66/22 kV Trf. (Pri.)	14818	18054.2	17549.5	14754	17360.2	18473.5	17228.2	15811.6	16892	14513	14389	18167
Energy Received from Tapi 66 kV at												
66/22 kV Trf. (Sec)	20409.8	21721.8	21724.4	18238.4	21360.8	23294.1	22051.7	19550.7	16747.13	14374.6	14836.35	18465.4
Aux. Consn.	33.95	35.7	33.49	33.83	30.3	34.12	36.46	31.9	29.66	31.3	28.347	32.7
Energy sent on 22 kV feeders	20375.85	21686.1	21690.91	18204.57	21330.5	23259.98	22015.24	19518.8	16717.47	14343.3	14808	18432.7
Energy sent from Kadodra 66 kV to												
Palsana	6501	5652	4911	4710	5016	6126	6547	6048	6672	6543	6093	6480
Garden Vareli	925.6	1305.4	1662.9	1947	1887.7	2392.9	1888.4	2471.1	2090.7	1860.3	1155.9	4506
Garden Jolva	1988	2470.5	2281.1	2637	2197	2597.16	2038.8	2642.8	1890	2271	1671.5	8505.6
66/11 kV Trf. (Pri.)	15569.6	15321.5	14989.9	15251.2	16165.4	16260.9	16352.6	16099.9	27179	25108	22958	19850
Energy Received from Kadodra 66 kV at												
Palsana	6292	5435	4836	4575	4816	5726	6345	5786	6417	6335	5930	6049
Garden Vareli	932.5	1315.7	1676.01	1959.18	1904.6	2412.8	1904.3	2491.3	2106.2	1874.3	1162	4527
Garden Jolva	1999.6	2479.6	2288.4	2647.6	2210.6	2605.5	2048.1	2650.8	1896	2277.3	1619.9	8515
66/22 kV Trf. (secondary)	14473.5	14058.15	14590.45	13055.2	14555.5	15130.6	15213.15	15306.6	26750	24760	22528	12956
Aux. Consn.	1.25	1.173	1.108	1.867	3.06	3.115	3.043	2.372	2.57	2.67	2.47	2.5
Energy sent on 22 kV feeders	14472.25	14056.98	14589.34	13053.33	14552.44	15127.49	15210.11	15304.23	26747.43	24757.3	22525.53	12953.5
Energy sent/received from Palsana 66 kV												
66/22 kV Trf. (Pri.)	6292	5435	4836	4575	4816	5726	6345	5786	6417	6335	5930	6049
66/22 kV Trf. (Sec)	6433	5645	4896	4769	5031	6108	6496	6006	6670	6490	6067	6511
Aux. Consn.	1.5	1.3	1	1.2	1.5	1.2	0.5	0.5	3.07	3.41	2.76	3.2





ENERGY RECEIVED AND SENT OUT AT ICHHAPORE 220 KV SIS FROM APRIL-2000 TO MARCH-2001												
All in MWH												
Period	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01
<b>Energy sent to Ichhapore 220 kV from</b>												
Reliance	517.2	658.8	222	396	240	8129	6	46	267	1431	885	732
Kawas	63396	47769	59939	55302	53121	55747	18913	32105	61237	60467	59846	51614
Essar	32783	49889	28844	33661	71351	49381	113888	64416	21832	23123	21969	50219
Vav	21.6	2.4	144	2068.8	156			0	254		223	154
<b>Energy Received at Ichhapore 220 kV from</b>												
Reliance	522.8	635.6	228	411	251	8012	6	46	266	1415	869	714
Kawas	632813	47554	59758	54934	52262	55184	18744	31723	60665	60269	59604	50218
Essar	34885	52459	30440	35683	75245	47161	109632	61344	20316	21516	19428	49152
Vav	21.6	2.4	144	2056.8	158.3			10	257		226	156
<b>Total energy received at Ichhapore 220 kV</b>	<b>98243</b>	<b>106650</b>	<b>90570</b>	<b>93084</b>	<b>27917</b>	<b>410357</b>	<b>28382</b>	<b>93113</b>	<b>81504</b>	<b>88200</b>	<b>80126</b>	<b>100240</b>
<b>Energy sent from Ichhapore 220 kV to</b>												
220/66 KV Trf. (Sec)	24668	24218	30592	32142	33274	32956	36410	30236	28782	28424	29334	34720
Reliance	522.8	635.6	228	411	251.2	32	6	46	47	719	68	396
Kawas	365	1233.6	1905	3878	16434	2431	25454	10626	145	115	125	1197
Essar	3104	1276	6168	6744	3200	1184	196	980	4180	3092	1180	1260
Vav	67318	70217	49457	47796	73020	74314	66638	51119	48384	50736	48530	56693
<b>Energy sent from Ichhapore 66 kV to</b>												
ONGC	1.26	50.4	0	0	0	0	0	8	0	40	10	0
HWP	1758.4	4788	5901.7	8324.6	7762.3	9690	8652	10996	9693	9772	7361	8859
Olpad+Rama Paper Mill	7287.7	6717.8	7642.1	6395.8	8388	8508	6506	9671	3564	5049	5376	5992
Variav+Essar Pump	8372.7	7224.1	8885.7	6996	9284.6	8975	7588	6296	6554	7001	9270	11333
66/11 KV Trf. (Pri.)	8254.7	8573	8546.6	8332.3	8956	9194	9826	8140	7341	7034	6823	8966



Energy Received from Ichhapore 66 kV at															28840				
ONGC	0.56	18.15													8		41	10	
HWP	1840.1	5248.8	6242.2	8701.7	8005.7	9395	7992	9892	10032	10158	7650	9027							
Olpad	5733.7	5064.7	5804.6	5752.5	6030.9	5606	4601	4151	2927	4551	5009	5461							
Rama Paper Mill	1742.1	1825.7	1981.4	1972.2	2204.3	2791	1828	2137	636	486	402	596							
Essar Pump	70.9	51.8	80.3	39.5	59.1	11	66	22	10	62	6	29							
Variav	8650.1	8591.8	8406.3	8274.8	8670.7	8937	9253	8005	7366	8995	11280	14366							
66/11 kV Trf. (Sec.)	9214	9471	9212	8953	9450	9191	9534	7939	6963	6600	6683	10034							
Aux. Consn.	12.18	12.64	12.57	13.75	13.54	13	14	20											
Energy sent on 11 kV feeders																			
Olpad	9448.3	9761.9	10739	9229.4	9392	9203	9970	8197											
Energy sent from Olpad 66 kV to																			
66/11 kV Trf. (Pri.)	5747.6	5694	5239.1	5116.3	5697.7	5386	5677	5445	5055	4926	4762	5496							
Energy Received from Olpad 66 kV at																			
66/11 kV Trf. (Sec.)	5408.3	5311.3	4847.3	4749.2	5302.3	4912	5197	4853	4724	4408	4252	5493							
Aux. Consn.	1.35	1.37	1.194	1.09	1.3	1	2	2	2	2	2	2							
Energy sent on 11 kV feeders																			
Variav	5407	5309.9	4846.1	4748.2	5301	4910	5196	4851	4723	4407	4250	5492							
Energy sent from Variav 66 kV to																			
66/11 kV Trf. (Pri.)	8450.1	8591.8	8406.3	8274.8	8670.7	8857	9253	7915	7346	7897	8908	11427							
Velenja+Vav	200					80		90	20	1097	2371	2940							
Energy Received from Variav 66 kV at																			
66/11 kV Trf. (Sec.)	8368.2	8501.4	8254.2	8149.8	8494.8	8699	9673	7745	6690	6225	6283	7986							
Aux. Consn.	2.62	2.79	2.95	3.35	4.11	4	4	4	5	4	4	5							
Energy sent on 11 kV feeders																			
	8365.6	8498.6	8251.3	8146.5	8490.7	8695	9669	7741	6685	6220	6279	7982							

Energy loss calculation at various scenarios at Vav and Icchapore Grid s/s							
All units in MWh	Case 1		Case 2		Case 3		Remark
	Energy loss	% loss	Energy loss	% loss	Energy loss	% loss	
<b>220 kV line loss</b>							
Ukai TPS-Vav	9240	0.8%	14311	1.3%	14311	1.3%	
Kawas-Vav	9926	1.1%	8975	1.0%	8975	1.0%	
KAPP-Vav	25266	2.7%	21069	2.3%	4366	0.5%	
Icchapore-Vav	5312	0.7%	4092	0.6%	4092	0.6%	
Vav-Navsan	-5771	-0.8%	56000	8.2%	1753	0.3%	@
Vav-Talangpore	11729	2.3%	9183	1.8%	9183	1.8%	
Vav-Zaqadia	820	0.4%	620	0.3%	620	0.3%	
Vav-Kim	-649	-0.1%	-476	-0.1%	1460	0.3%	
220/66 kV Tr loss	69217	3.5%	61397	3.0%	8108	0.4%	
<b>66 kV line loss</b>							
Relience-icchapore	2150	11.4%	2064	11.0%	94	0.5%	
Essar-icchapore	4284	0.7%	8322	1.4%	8322	1.4%	
Kawas- icchapore	4789	0.7%	5319	0.8%	5319	0.8%	
220/66 kV Tr. loss	2975	0.8%	26767	7.2%	745	0.2%	
<b>66 kV line loss</b>							
Krib-Sarthana	289	0.6%	470	0.9%	470	0.9%	
Vav-Tapi	22781	5.0%	22193	5.0%	22193	5.0%	
Vav-Kadodra	1967	0.7%	8377	2.8%	8377	2.8%	
Vav-Bardoli	5316	4.4%	5520	4.4%	5520	4.4%	
Vav-Mandvi	258	0.3%	7163	9.3%	3658	4.6%	
Kadodra-Palsana	2757	3.9%	2379	3.4%	2379	3.4%	
Vav-SEC-C Stn	-6038	-1.2%	-1206	-0.2%	14411	2.8%	@
Vav-SEC-E stn	-1621	-0.4%	-55	0.0%	10136	2.2%	@
Kadodra-G Vareli	-172	-0.7%	-172	-0.71%	17	0.07%	@
Kadodra-G Jolva	-48	-0.1%	-48	-0.14%	17	0.05%	@
<b>66/22/11 kV Transformation loss (Vav)</b>							
Icchap-HWP	-626	-0.7%	-626	-0.7%	112	0.12%	@
Icchap-RNPL&Olpad	1804	2.2%	1680	2.1%	2497	3.10%	@
Icchp-EP& Variav	-13521	-13.8%	-12633	-13%	1368	1.40%	@
<b>66/22/11 kV Transformation loss (Vav)</b>							
66/22 kV Tapi	-34765	-17.6%	-33136	-17.0%	779	0.4%	@
66/22 kV Kadodra s/s	17729	8.0%	16225	7.4%	809	0.4%	@
66/22 kV Bardoli s/s	1465	1.3%	1465	1.3%	1465	1.28%	
66/11 kV Zankvav	313	1.5%	159	0.8%	159	0.75%	
66/22 kV Palsana	-2580	-3.8%	-708	-1.0%	137	0.20%	
66/11 kV Icchapore	-3259	-3.3%	-3614	-3.6%	399	0.40%	
66/11 kV Olpad	4785	7.4%	3455	5.5%	237	0.40%	
66/11 kV Varav	8927	8.6%	9083	8.9%	267	0.30%	
Correction factor has been applied at each element and technical loss correction has been also applied at places indicated by @ in the remerak							

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<b>Vav EHV Grid s/s Energy Data</b>	<b>Case-1</b>	<b>Case-2</b>	<b>Case-3</b>
<b>Energy sent to 220 kV Vav from</b>	<b>Before CF</b>	<b>After CF</b>	<b>CF+Tech loss</b>
Ukai TPS 1	545180	545180	
Ukai TPS 2	545143	545143	
Ukai TPS 1+2	1090323	1090323	1090323
Kawas	925717	926689	926689
KAPP 1	456413	456413	
KAPP 2	453812	453812	
KAPP 1+2	910225	910225	910225
Ichhapore	709453	706402	706402
Navsan	1691	1688	1688
Talangpore	8924	8901	8901
Zagadia	149398	149010	149010
Kim	3599	3579	3579
<b>Total energy sent to Vav</b>	<b>3799329</b>	<b>3796817</b>	<b>3796817</b>
<b>Energy Received at 220 kV Vav from</b>			
Ukai TPS 1	547925	546501	
Ukai TPS 2	532021	528297	
Ukai TPS (1+2)	1079946	1074798	1074798
Kawas	915784	917707	917707
KAPP 1	449860	451704	
KAPP 2	434874	437266	
KAPP (1+2)	884734	888970	905674
Ichhapore	704245	702414	702414
Navsan	1299	1298	1298
Talangpore	8520	8498	8498
Zagadia	147853	147468	147468
Kim	3928	3918	3918
<b>Total energy Received at Vav</b>	<b>3746309</b>	<b>3745070</b>	<b>3761774</b>
<b>Energy sent from 220 kV Vav to</b>			
Kim	451724	449691	449691
Talangpore	491788	489575	489575
Zagadia	48934	48714	48714
Navsan	685896	681301	681301
Ukai TPS 1	9345	9303	
Ukai TPS 2	7844	7809	
Ukai TPS (1+2)	17189	17112	17112
Kawas	14	14	14
KAPP 1	7924	7976	
KAPP 2	3734	3722	
KAPP (1+2)	11658	11698	11698
Ichhapore	3124	3110	3110
220/66 kV Trf. (Pri.)	2000373	2026928	2026928
<b>Total energy sent from 220 kV Vav</b>	<b>3710701</b>	<b>3728143</b>	<b>3728143</b>
<b>Energy Received from 220 kV Vav at</b>			
Kim	452043	449828	447892
Talangpore	480463	480795	480795
Zagadia	49660	49635	49635
Navsan	692060	625691	679938
Ukai TPS 1	9616	9616	
Ukai TPS 2	8710	8710	
Ukai TPS (1+2)	18326	18326	18326
Kawas	21	21	21
KAPP 1	8202	8202	
KAPP 2	3681	3681	

KAPP (1+2)	11883	11883	11883
Ichhapore	3020	3007	3007
220/66 kV Trf. (Secondary)	1931156	1965531	2018820
Aux. Consn.	615	615	615
<b>Total energy Received from 220kV Vav</b>	<b>3338632</b>	<b>3604717</b>	<b>3710318</b>
<b>Energy sent from 66 kV Vav to</b>			
Kamrej	600	629	629
Velenja+Variav	776	788	788
Kribco (1+2)	52159	52225	52225
Tapi (1+2+3+4)	455818	444913	444913
SEC-C stn.(C1+C2)	493006	495742	511360
SEC-E stn (E1+E2)	440098	440648	450839
Kadodra	294220	297883	297883
Sachin A	3000	3384	3384
Sachin B	2520	2520	2520
Bardoli	121325	125984	125984
Mandvi	76457	76855	79857
<b>Total energy sent from 66 kV Vav</b>	<b>1939979</b>	<b>1941570</b>	<b>1970380</b>
<b>Energy Received from 66 kV Vav at</b>			
Kamrej (Exp at Vav)	600	629	629
Velenja+Variav (Exp at Vav)	776	788	788
Kribco (1+2)	1746	1771	1771
Sarthana	0	0	0
Tapi (1+2+3+4)	433037	422720	422720
SEC-C stn. (1+2)	499044	496948	496948
SEC-E stn (1+2)	441719	440703	440703
Sachin -A (Exp at Vav)	3000	3384	3384
Sachin -B (Exp at Vav)	2520	2520	2520
Kadodra (1+2)	292253	289506	289506
Bardoli	116009	120464	120464
Mandvi	76199	69692	76199
<b>Total Energy Received</b>	<b>1866902</b>	<b>1849123</b>	
<b>Sarthana s/s</b>			
<b>Energy sent/received from Sarthana 66 kV</b>			
66/22 kV Trf. (Pri.)	0	0	
66/22 kV Trf. (Sec)	50125	49984	49984
Aux. Consn.	13	13.3	
<b>Energy sent on 22 kV feeders</b>	<b>50112</b>	<b>50112</b>	<b>50112</b>
<b>Tapi s/s</b>			
<b>Energy sent from Tapi 66 kV to</b>			
Udhana	204615	209434	166455
SEC-A stn.	61563	61502	61502
66/22 kV Trf. (Pri.)	198010	194763	194763
<b>Energy Received from Tapi 66 kV at</b>			
66/22 kV Trf. (Sec)	232775	227898	193984
Aux. Consn.	392	392	
<b>Energy sent on 22 kV feeders</b>	<b>232393</b>	<b>232393</b>	
<b>Kadodra s/s</b>			
<b>Enrgy sent from Kadodra 66 kV to</b>			
Palsana	71299	70921	70921
Garden Vareli	24094	24094	24283
Garden Jolva	33190	33190	33255
66/22 kV Trf. (Pri.)	221106	218416	203000
<b>Energy Received from Kadodra 66 kV at</b>			
Palsana	68542	68542	68542
Garden Vareli	24266	24266	24266

Garden Jolva	33238	33238	33238
66/22 kV Trf.(secondary)	203377	202191	202191
Aux. Consn.	27	27	
Energy sent on 22 kV feeders	203350	202164	
Palsana s/s	0		
Energy sent/received from Palsana 66 kV			
66/22 kV Trf. (Pri.)	68542	69539	68542
66/22 kV Trf. (Sec)	71122	70248	68405
Aux. Consn.	21	21	
Energy sent on 22 kV feeders	71101	71101	71101
Bardoli s/s	0		
Energy sent/received from Bardoli 66 kV			
Energy sent to Mahuwa	1923	6378	6378
66/11 kV Trf. (Pri.)	114086	114086	114086
66/11 kV Trf. (Sec)	112621	112621	112621
Aux. Consn.	36.9	37	
Energy sent on 11 kV feeders	112584	112584	112584
Mandvi s/s	0		
Energy sent/received at Mandvi 66 kV			
Zankhavav	0	0	
66/11 kV Trf. (Pri.)	0	0	
66/11 kV Trf. (Sec)	58645	55284	55284
Aux Consn.	36	36	
Energy sent on 11 kV feeders	58609	55249	55249
Zankhavav s/s	0	0	
Energy sent/received at Zankhavav 66 kV	0	0	
66/11 kV Trf. (Pri.)	21293	21080	21080
66/11 kV Trf. (Sec)	20980	20921	20921
Aux. Consn.	24	24	
Energy sent on 11 kV feeders	20956	20956	20956



For Sample Size

For Sample Size

		Mehsana		Vav and Icchapore			
		Before applying Correction Factor	After applying Correction Factor	After Incorporating technical energy loss (Wherever required)	Before applying Correction Factor	After applying Correction Factor	After incorporating technical energy loss (Wherever required)
Total annual energy Input		4032.41	3991.74	3765.12	4284.92	4284.30	4284.30
Total annual energy out put		1488.82	1516.41	1516.41	3932.80	3847.75	3856.95
Total annual energy export		2075.84	2094.95	2094.95	275.11	284.74	241.80
Total annual energy loss		467.74	380.38	153.76	77.01	151.81	185.55
% Loss		11.60%	9.53%	4.08%	1.80%	3.54%	4.33%



Load flow summary for three different loading conditions for the selected Sample grid substations

**Mehsana**

Technical Loss Calculation (Sept 7th, 2000)					
Power input, MW	Power loss, MW	% loss	Energy input, MWh	Tech. Energy loss, MWh	% Loss
191.39	6.60	3.449%	1280669.722	35735.70168	2.79%

Technical Loss Calculation (Mar 29th, 2000)					
Power input, MW	Power loss, MW	% loss	Energy input, MWh	Tech. Energy loss, MWh	% Loss
147.76	3.78	2.557%	1087263.701	24725.46839	2.274%

Technical Loss Calculation (Sept 15th, 2000)					
Power input, MW	Power loss, MW	% loss	Energy input, MWh	Tech. Energy loss, MWh	% Loss
210.88	7.81	3.70%	1564670.554	51722.1936	3.31%

Technical Loss Calculation (2 July, 2000)					
Power input, MW	Power loss, MW	% loss	Energy input, MWh	Tech. Energy loss, MWh	% Loss
115.55	3.05	2.64%	685275.5604	13982.10526	2.040%

**Vav and Icchapore**

Technical Loss Calculation (Sept 7th, 2000)					
Power input, MW	Power loss, MW	% loss	Energy Input, MWh	Tech. Energy loss, MWh	% Loss
636.53	18.97	3%	4907054	134604	2.70%

Technical Loss Calculation (Mar 29th, 2000)					
Power input, MW	Power loss, MW	% loss	Energy Input, MWh	Tech. Energy loss, MWh	% Loss
708.37	15.44	2.18%	5398629	105498	1.95%

Technical Loss Calculation (Sept 15th, 2000)					
Power input, MW	Power loss, MW	% loss	Energy Input, MWh	Tech. Energy loss, MWh	% Loss
687.26	20.13	2.77%	4756114	116383	2.40%

Technical Loss Calculation (2 July, 2000)					
Power input, MW	Power loss, MW	% loss	Energy Input, MWh	Tech. Energy loss, MWh	% Loss
626.15	14.85	2.37%	4662313	97564	2.10%



### **Categorization of Zones in to predomenantly Industrial and Agricultural**

<b>Zone</b>	<b>Circle</b>	<b>Type</b>
South	Valsad	Industrial
South	Surat	Industrial
South	Bharuch	Industrial
Central	Baroda	Industrial
Central	Baodda City	Mix
Central	Anand	Mix
Central	Godhra	Industrial
North	Sabarmati	Mix
North	Mehsana	Agricultural
North	Palanpur	Agricultural
North	Himmatnagar	Agricultural
West 1	S'Nagar	Mix
West 2	Rajkot	Mix
West 1	Bhavnagar	Mix
West 2	Jamnagar	Mix
West 1	Porbandar	Agricultural
West 1	Amreli	Agricultural
West 2	Bhuj	Agricultural

### **Zone Predominantly type**

<b>North</b>	Agricultural
<b>Central</b>	Industrial
<b>South</b>	Industrial
<b>West 1</b>	Agricultural
<b>West 2</b>	Agricultural



## Section 2

# **Distribution Network Annexure**



## **Distribution System (11 kV and below Network)**

- ⇒ *North Zone***
- ⇒ *Central Zone***
- ⇒ *South Zone***
- ⇒ *West Zone 1***
- ⇒ *West Zone 2***



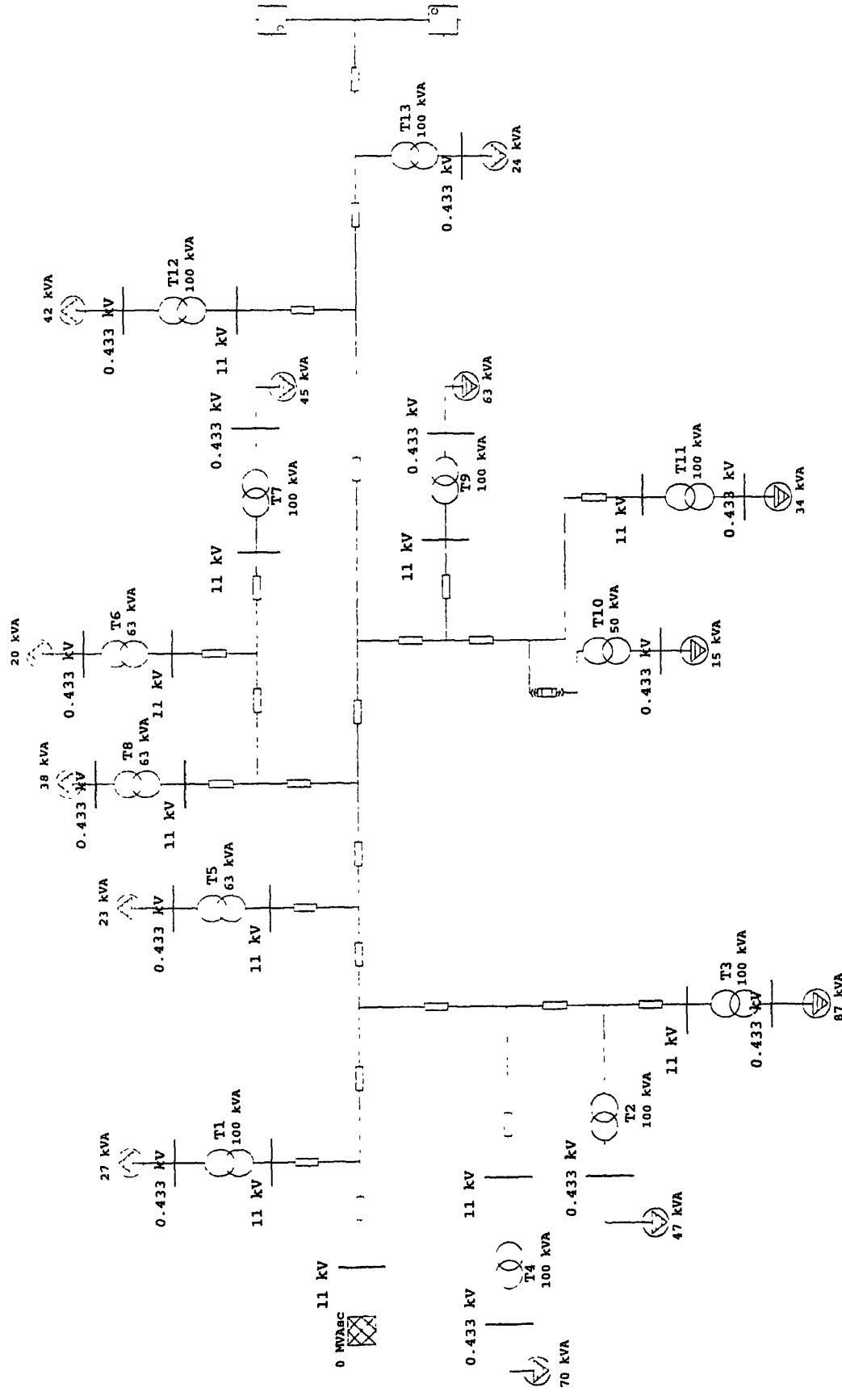


## **Distribution System North Zone**

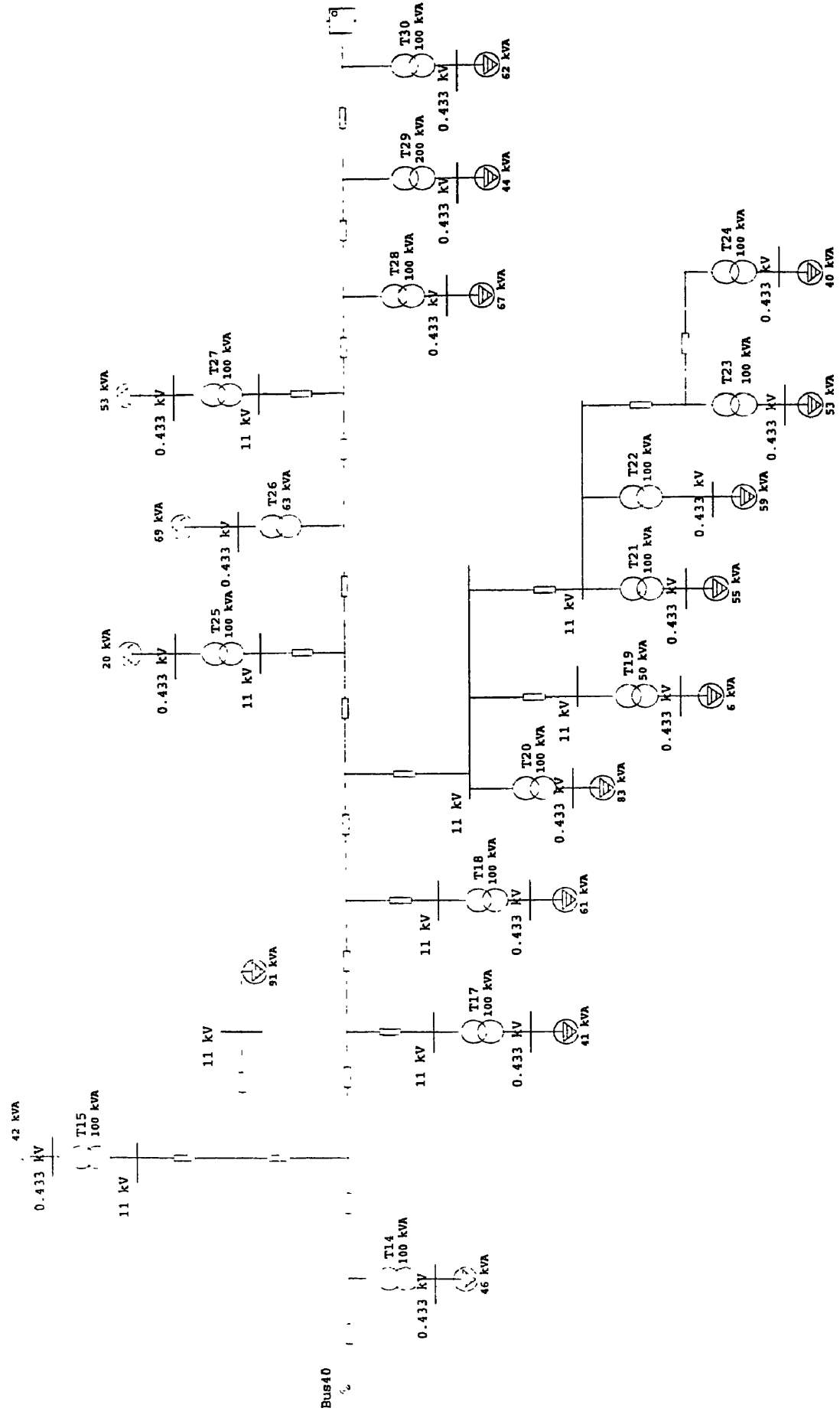
- ⇒ One Line Diagram of the 11 kV network*
- ⇒ Load Flow Summary Report*
- ⇒ Energy Losses and Agricultural Consumption*  
*Sample Case*
- ⇒ Transformers and Agricultural Consumers*
- ⇒ Sanctioned Demand Analysis*
- ⇒ Summary for the Zone*

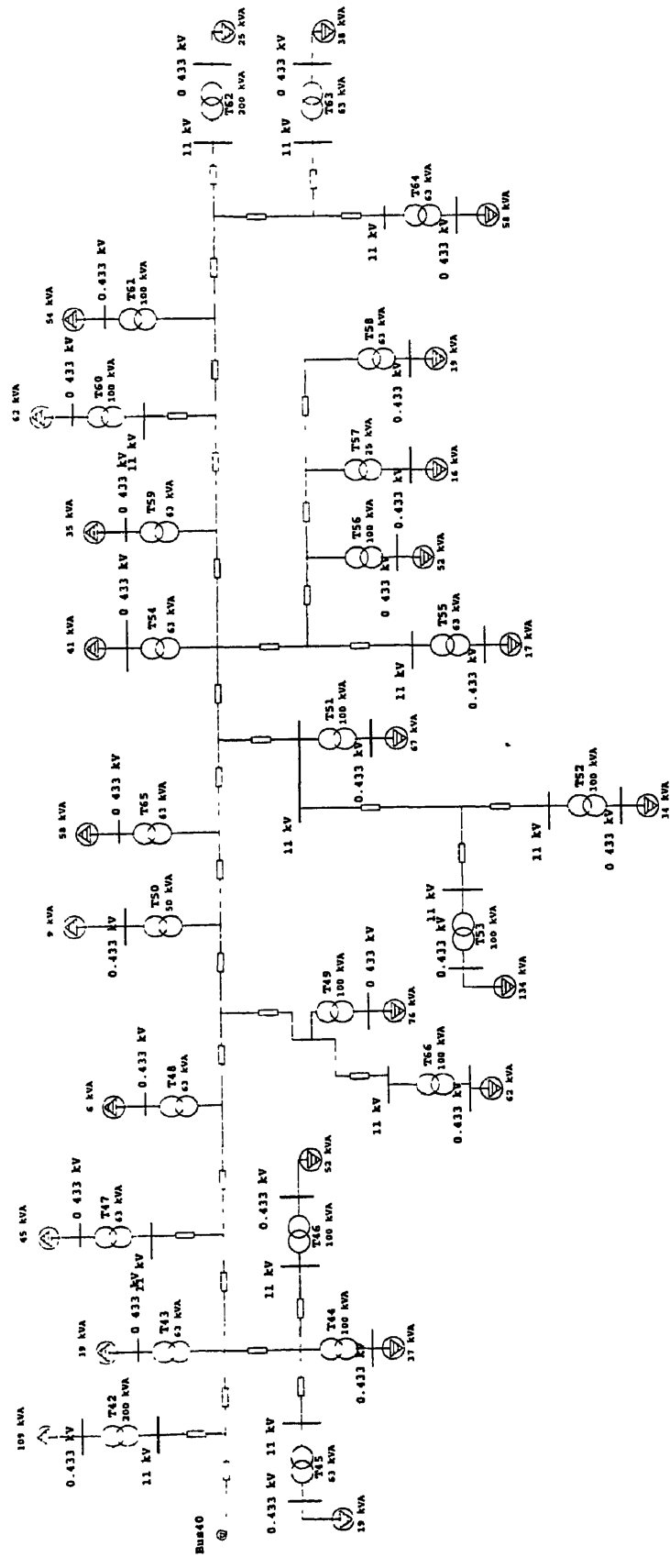


# One-Line Diagram - RAJKAMAL

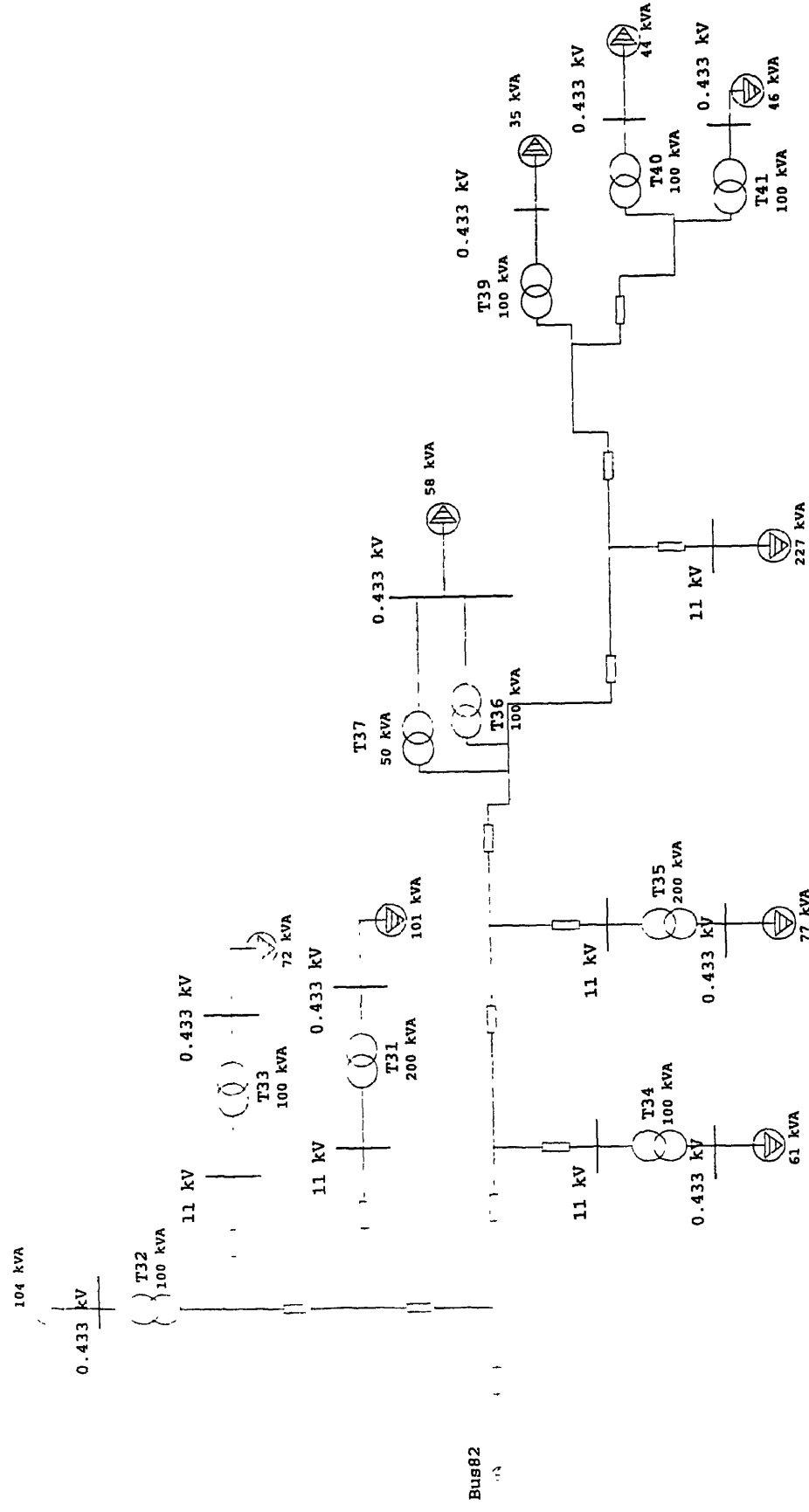


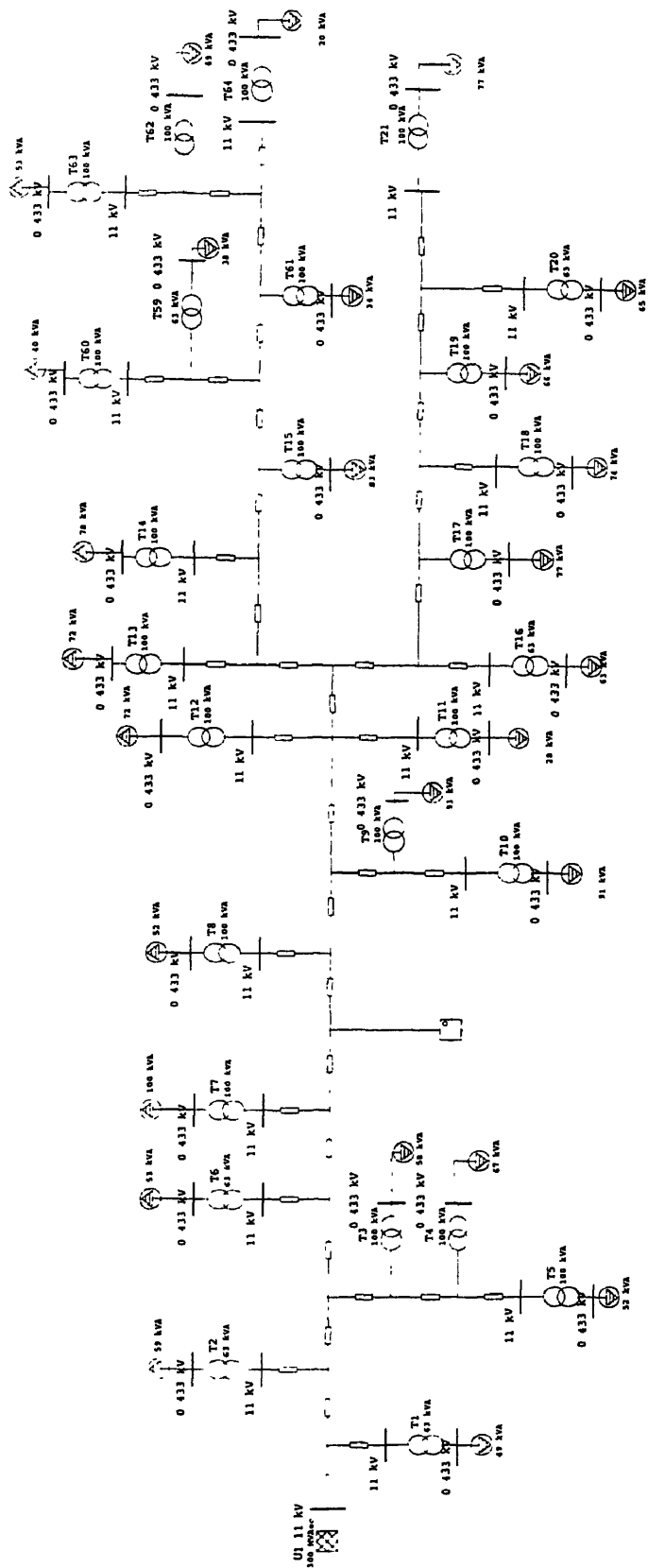
# One-Line Diagram - RAJKAMAL=>Network1





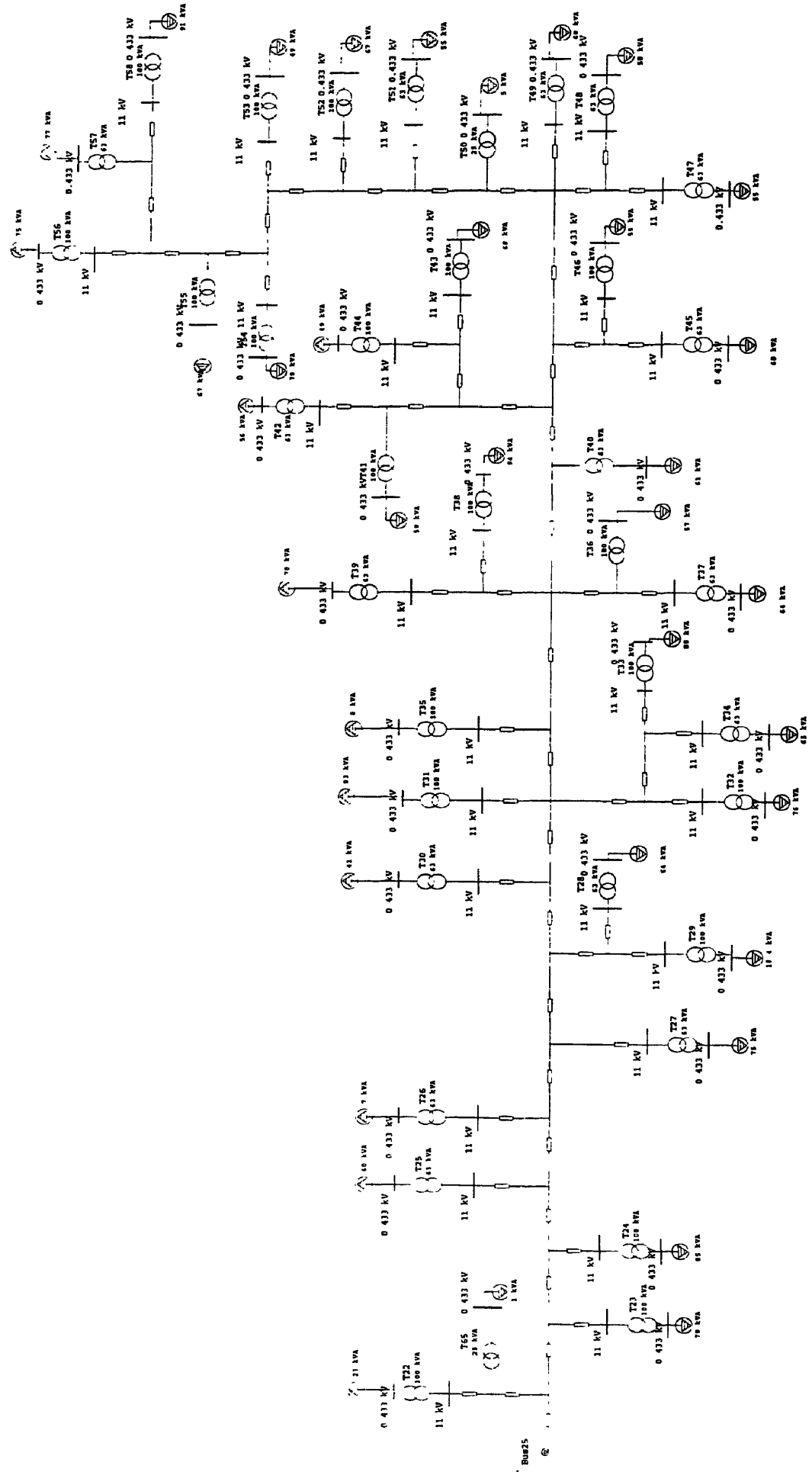
# One-Line Diagram - RAJKAMAL=>...=>Network3



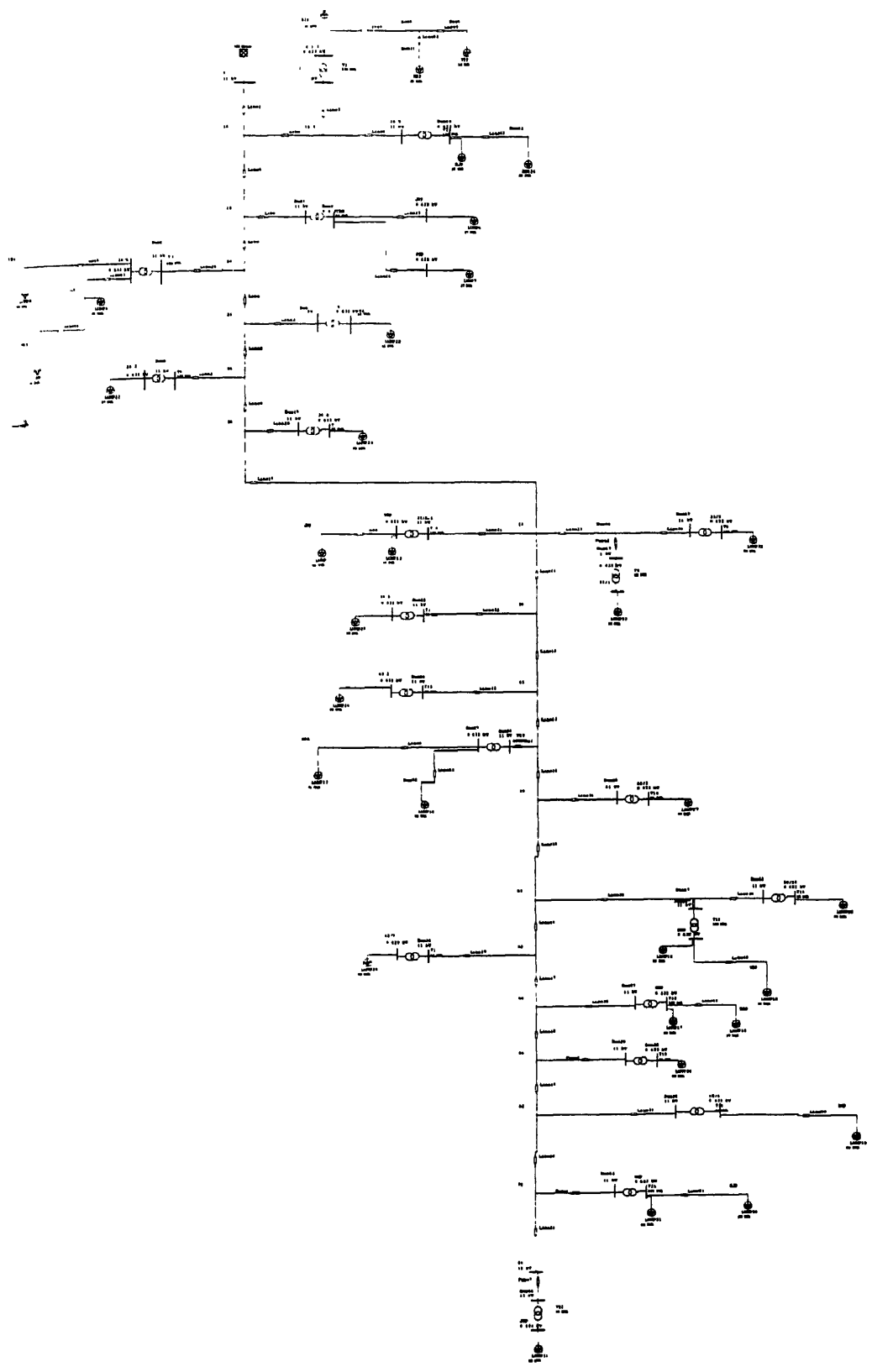


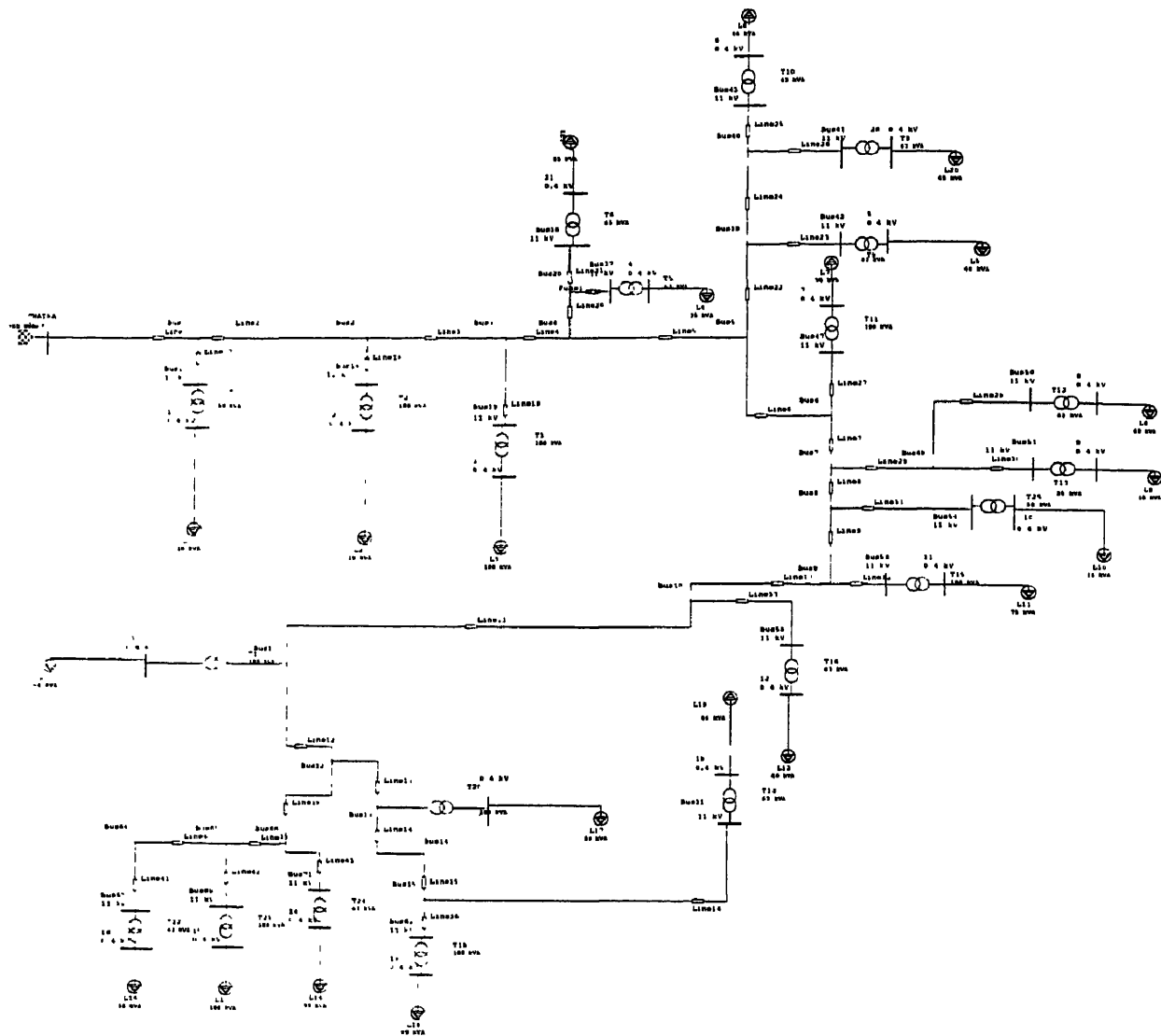


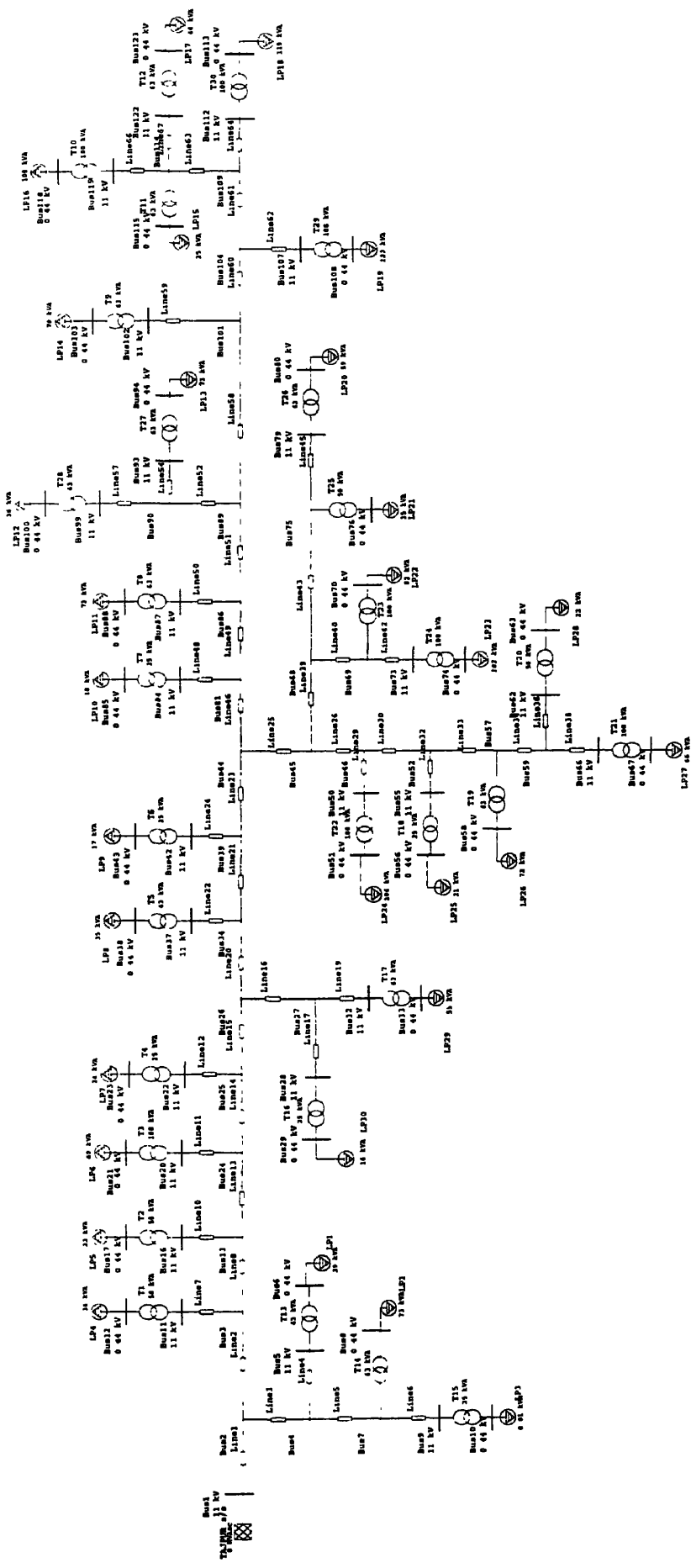
# One-Line Diagram - OLV1=>Network1



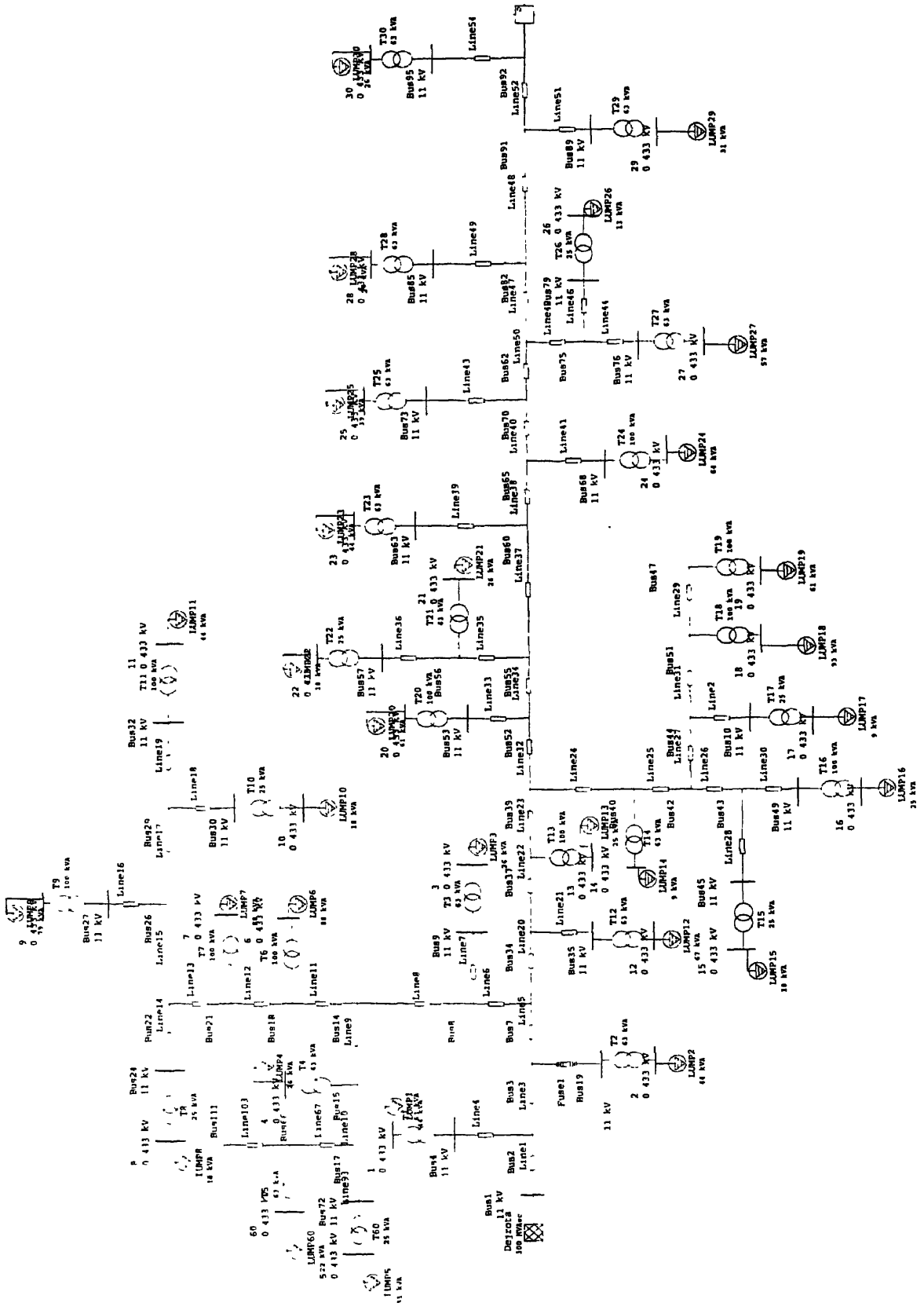
One-Line Diagram - OLV1

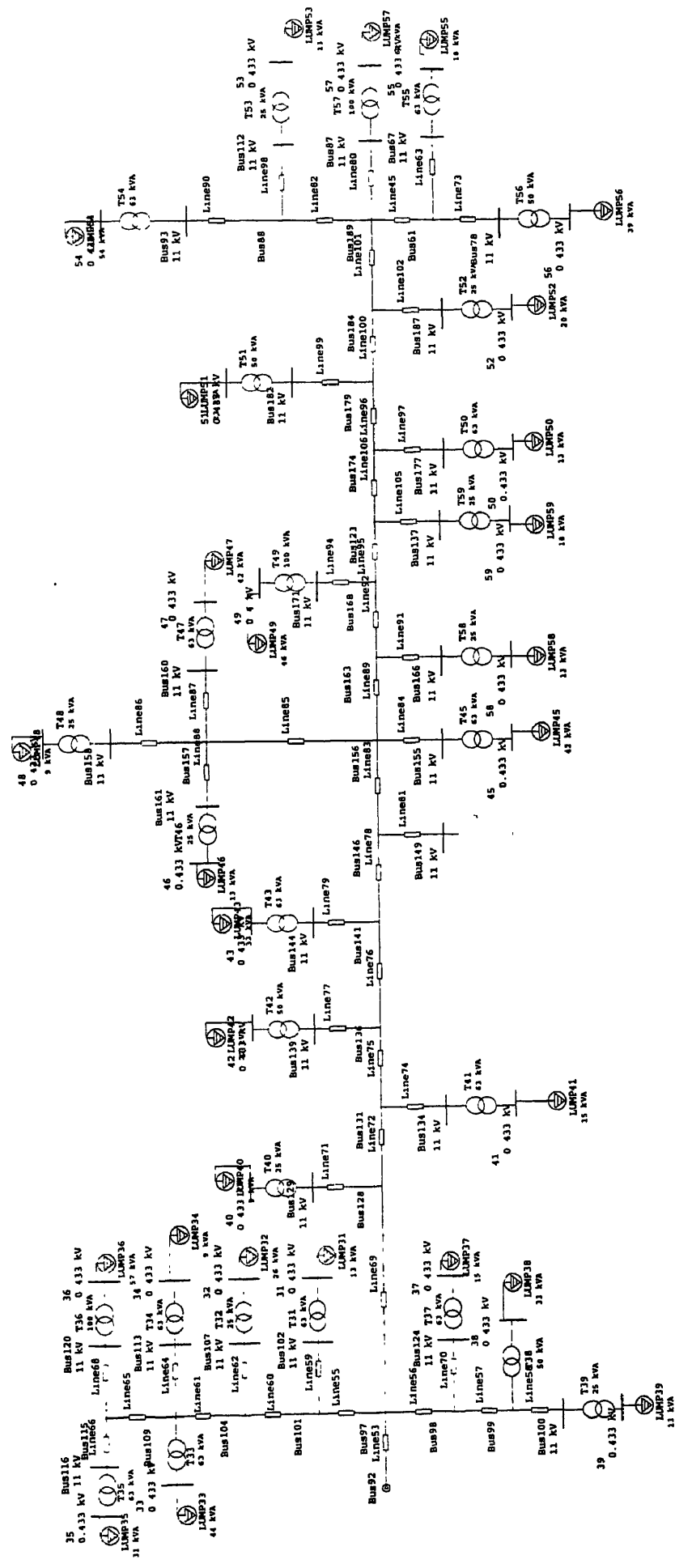




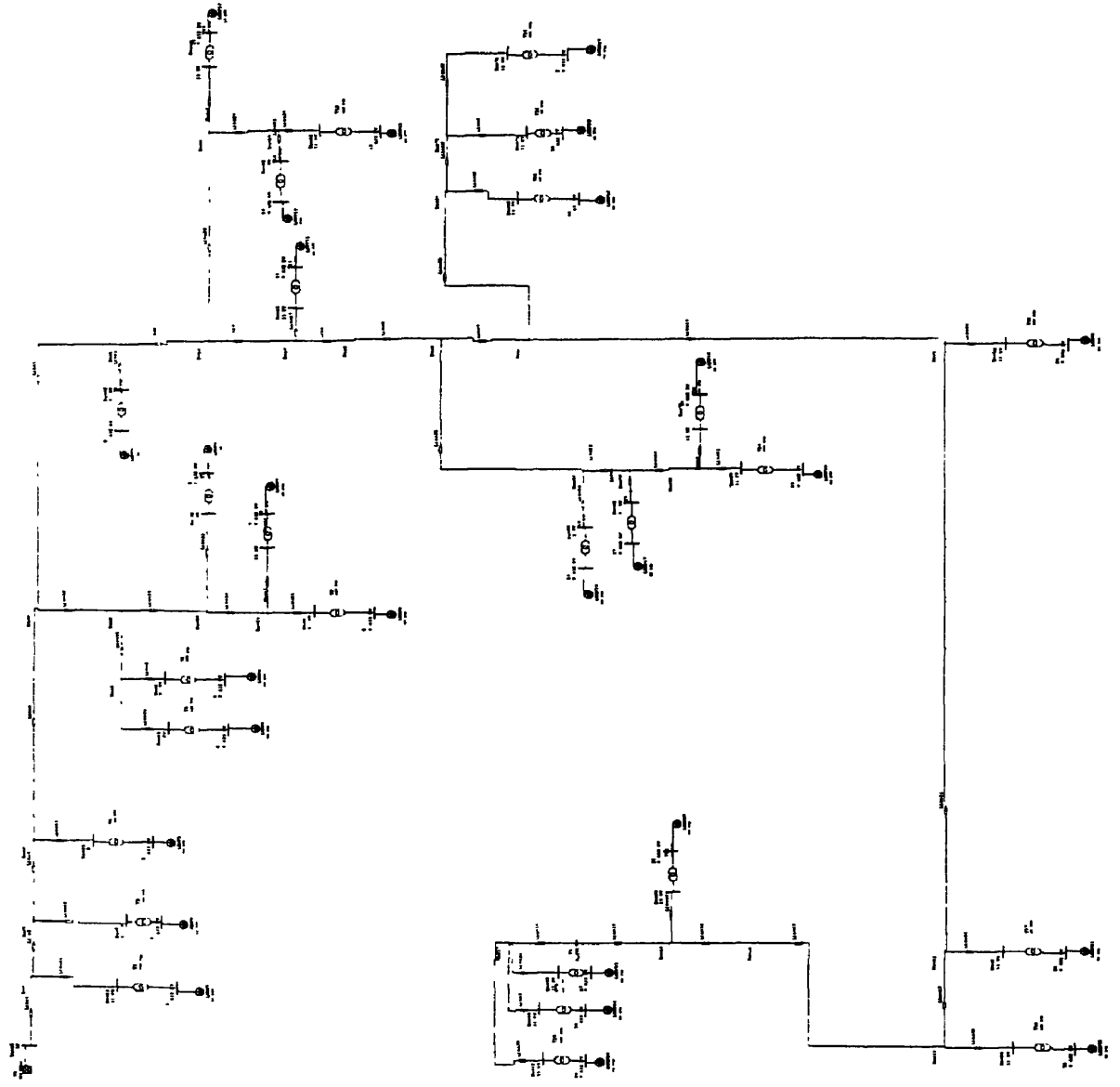


# One-Line Diagram - OLV1

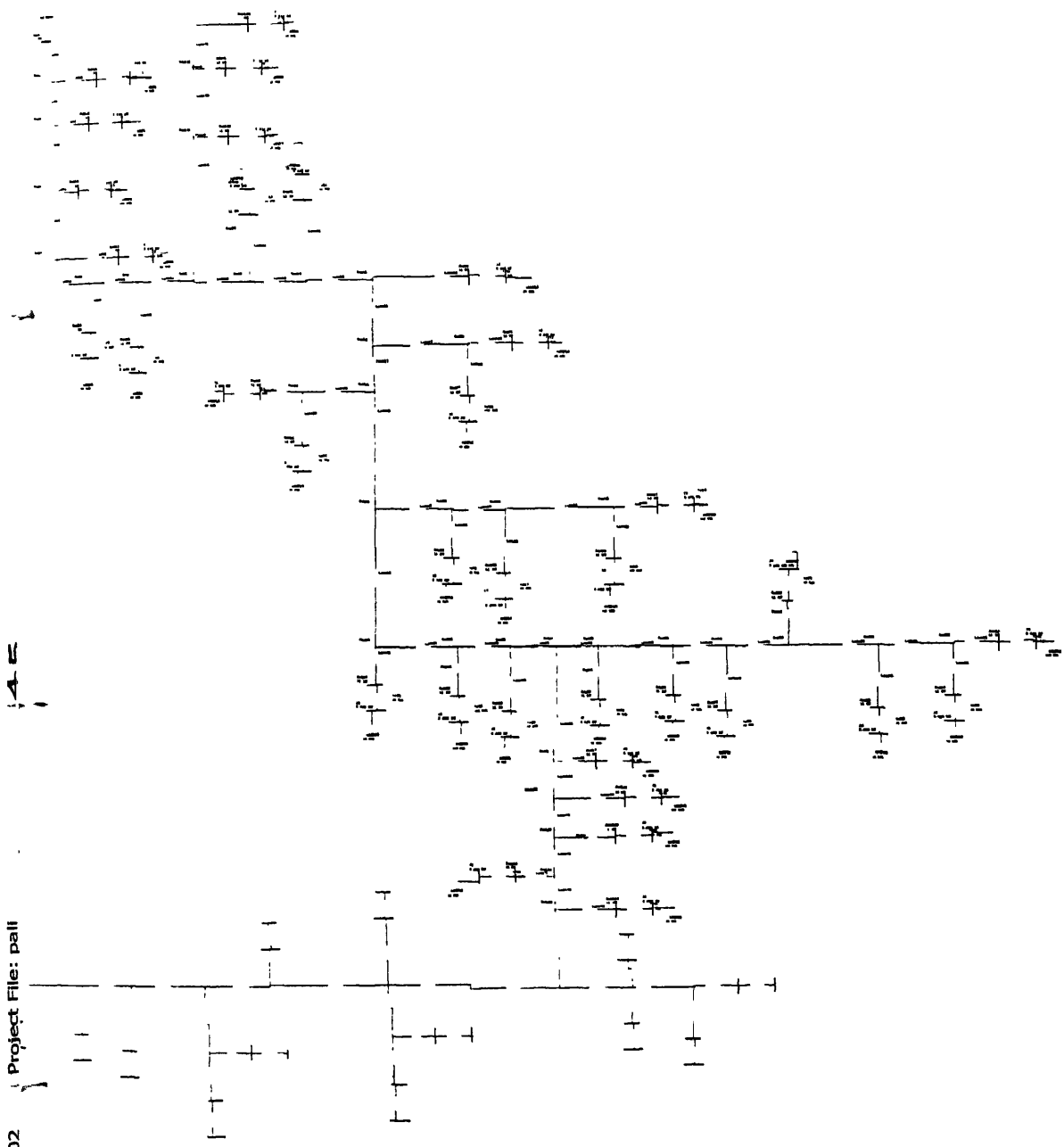




# One-Line Diagram - OLV1



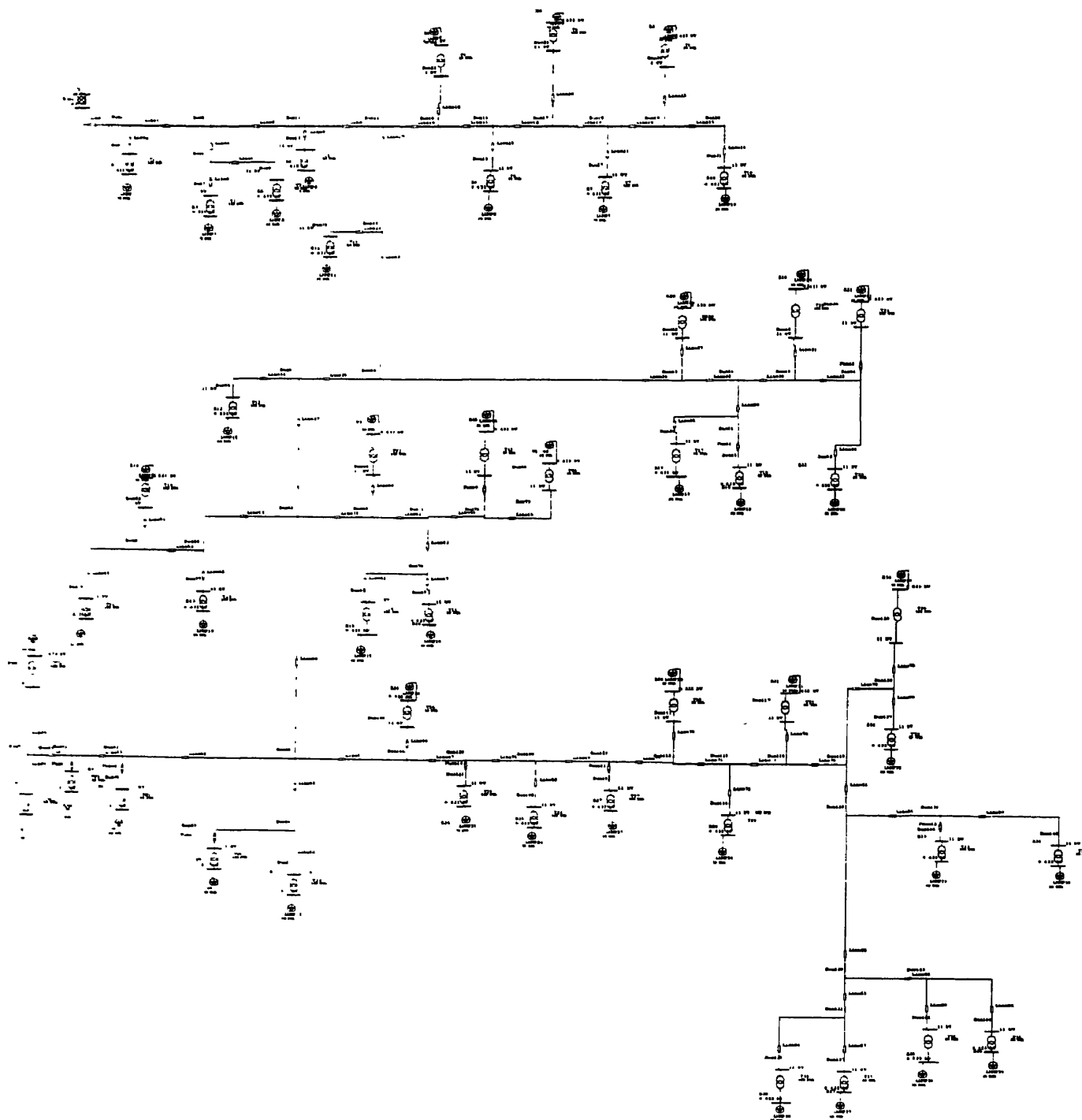
ne-Line Diagram - OLV1

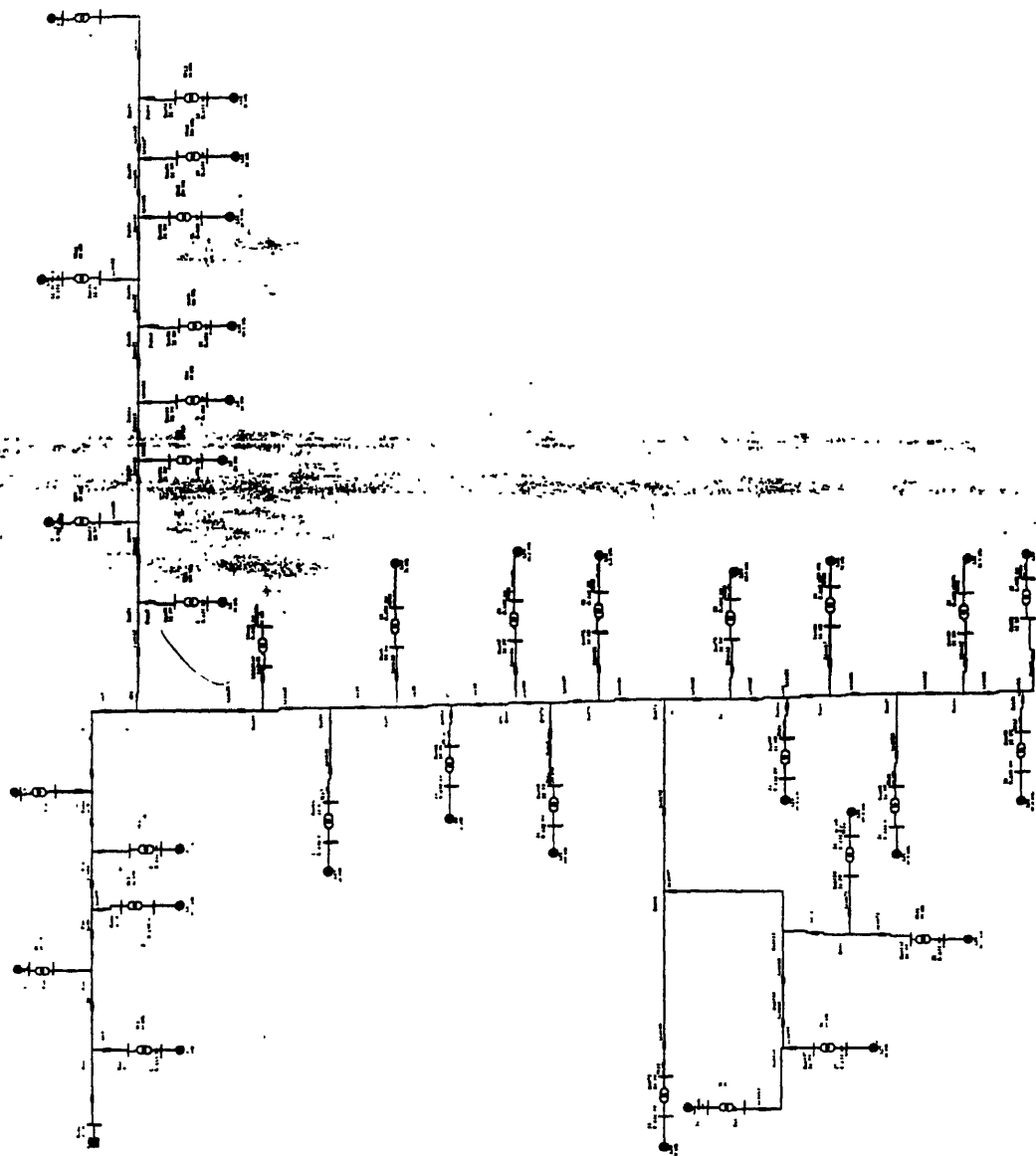


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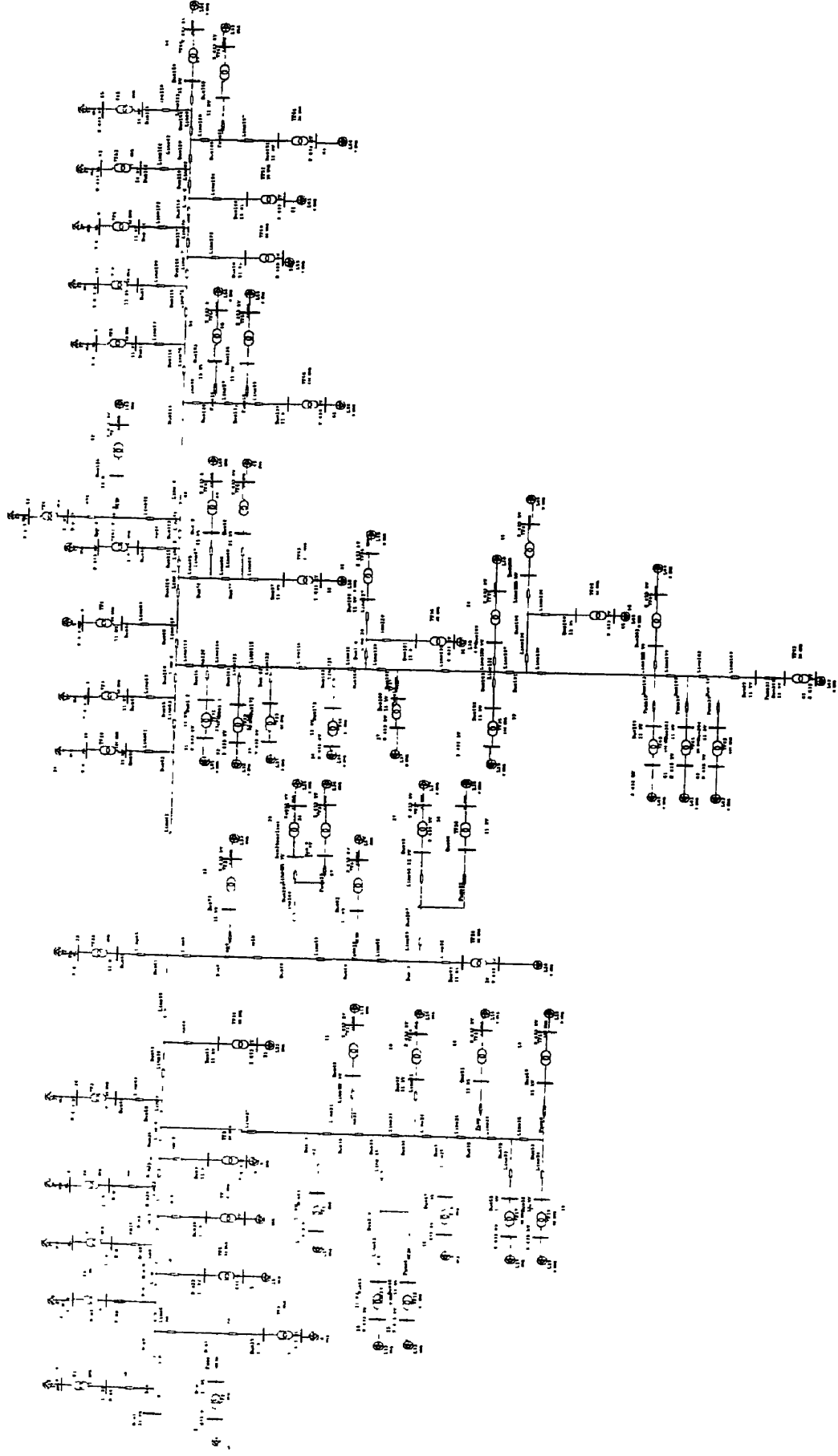


# One-Line Diagram - OLV1

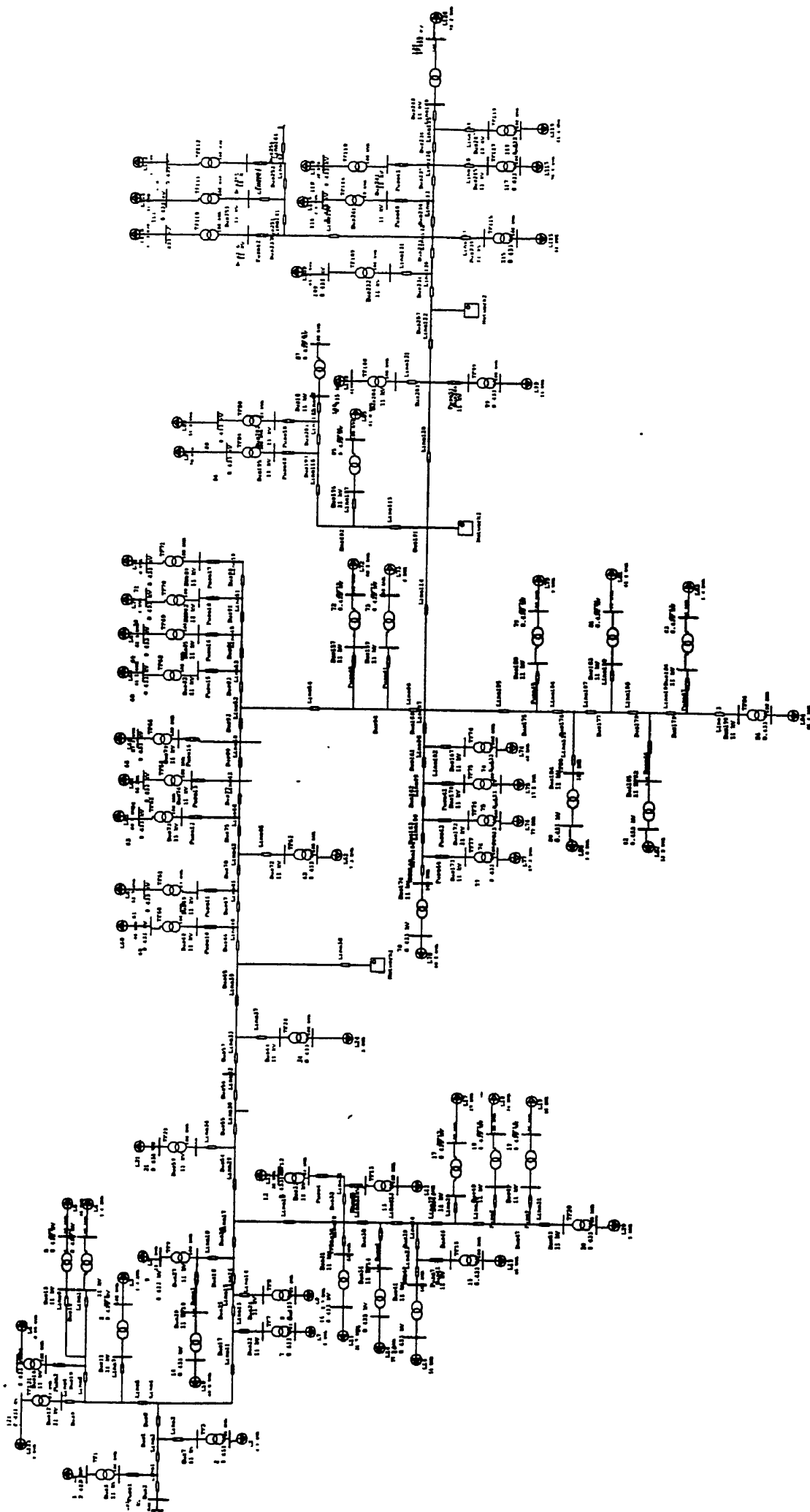




# One-Line Diagram - OLV1



# ne-Line Diagram - Viramgaon



Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐  
  
Filename: ☐Rajkamal

**PowerStation**

3.0.2C

Study Case: LF

Page: ☐1  
Date: ☐01-22-2002  
SN: ☐TATAENERGY  
Revision: ☐Base  
  
Config.: ☐Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 5

Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00


Unit System: Metric

Project Filename: Rajkamal

Output Filename: C:\etaps-3.0.2\PowerStn\Rajkamal\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	3.34	1.76	3.77	88.41 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	3.34	1.76	3.77	88.41 Lagging
Total Motor Load:	3.06	1.48	3.40	89.99 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.27	0.28		
System Mismatch:	0.04	0.03		


Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐  
Filename: ☐Pilludara

**PowerStation**  
  
3.0.2C  
  
Study Case: LF

Page: ☐1  
Date: ☐01-18-2002  
SN: ☐TATAENERGY  
Revision: ☐Base  
  
Config.: ☐Normal

**Electrical Transient Analyzer Program**  
**ETAP PowerStation**  
**Load Flow Analysis**  
Loading Category: Design  
Normal Loading

Method of Solution: Gauss-Seidel Method

Maximum Number of Iteration: 9000  
Precision of Solution: 0.000001 MW and Mvar  
Load Flow Acceleration Factor: 1.45  
System Frequency: 50.00  
Unit System: Metric  
Project Filename: Pilludara  
Output Filename: C:\etaps-3.0.2\PowerStr\Pilludara\Untitled.lf1

**SUMMARY OF TOTAL GENERATION , LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	3.89	2.12	4.43	87.81 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	3.89	2.12	4.43	87.81 Lagging
Total Motor Load:	3.48	1.69	3.87	90.00 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.41	0.43		
System Mismatch:	0.06	0.04		

Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐  
  
Filename: ☐Lampura

**PowerStation**

3.0.2C

Study Case: LF

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SN: ☐TATAENERGY  
Revision: ☐Base  
  
Config.: ☐Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 5

Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00

Unit System: Metric

Project Filename: Laxmipura

Output Filename: D:\etpdata\Laxmipura\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	2.53	0.13	2.85	88.85 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	2.53	1.31	2.85	88.85 Lagging
Total Motor Load:	2.21	1.05	2.45	90.25 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.29	0.24		
System Mismatch:	0.00	0.00		

3.0.2C

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Study Case: LF

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>			
Number of Buses:	1	0	81	82			
	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	22	0	0	53	0	6	81
Method of Solution:	Newton-Raphson Method						

Maximum Number of Iteration: 5  
 Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00  
 Unit System: Metric  
 Project Filename: madhi  
 Output Filename: D:\etpdata\madhi\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Swing Bus(es):	1.00	0.65	1.19	84.07 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	1.00	0.65	1.19	84.07 Lagging
Total Motor Load:	0.97	0.60	1.14	85.00 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.04	0.05		
System Mismatch:	0.00	0.00		
Number of Iterations: 2				



Project: <input type="checkbox"/>	<b>PowerStation</b>	Page: <input type="checkbox"/> 1
Location: <input type="checkbox"/>	3.0.2C	Date: <input type="checkbox"/> 01-15-2002
Contract: <input type="checkbox"/>		SN: <input type="checkbox"/> TATAENERGY
Engineer: <input type="checkbox"/>		Revision: <input type="checkbox"/> Base
Filename: <input type="checkbox"/> Bileswarpura	Study Case: LF	Config.: <input type="checkbox"/> Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 99

Precision of Solution: 0.000100 MW and Mvar

System Frequency: 50.00

Unit System: Metric

Project Filename: Bileswarpura

Output Filename: D:\etpdata\Bileswarpura\Untitled.lf1

**SUMMARY OF TOTAL GENERATION , LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	1.01	0.53	1.14	88.58 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	1.01	0.53	1.14	88.58 Lagging
Total Motor Load:	0.97	0.47	1.07	90.00 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.04	0.06		
System Mismatch:	0.00	0.00		

PowerStation  
30.20

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Date: 02-02-2002  
SN: TATAENERGY  
Revision: Base  
Config: Normal

Study Case: LF

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SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Buses:	1.548	0.715	1.705	90.79 Lagging
Generators:	0.000	0.000	0.000	100.00 Lagging
Total Demand:	1.548	0.715	1.705	90.79 Lagging
Total Motor Load:	1.514	0.648	1.647	91.94 Lagging
Total Static Load:	0.000	0.000		
Apparent Losses:	0.034	0.067		
System Mismatch:	0.075	0.027		

Number of iterations: 1

Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐

Filename: ☐Meherpura

**PowerStation**

3.0.2C

Study Case: LF

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Revision: ☐Base

Config.: ☐Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

Method of Solution: Gauss-Seidel Method

Maximum Number of Iteration: 9000  
Precision of Solution: 0.000000 MW and Mvar  
Load Flow Acceleration Factor: 1.45  
System Frequency: 50.00  
Unit System: Metric  
Project Filename: Meherpura  
Output Filename: C:\etaps-3.0.2\PowerStr\Meherpura\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	1.80	1.21	2.17	82.93 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	1.80	1.21	2.17	82.93 Lagging
Total Motor Load:	1.69	1.05	1.98	85.00 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.11	0.17		
System Mismatch:	0.00	0.00		

**PowerStation**

Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐  
  
Filename: ☐pali

3.0.2C

Study Case: LF

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Date: ☐01-16-2002  
SN: ☐TATAENERGY  
Revision: ☐Base  
  
Config.: ☐Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 5

Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00

Unit System: English

Project Filename: pali

Output Filename: D:\PowerStrn\pali\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	0.99	0.51	1.11	88.98 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	0.99	0.51	1.11	88.98 Lagging
Total Motor Load:	0.95	0.46	1.05	90.00 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.04	0.05		
System Mismatch:	0.00	0.00		

Project: <input type="checkbox"/>	<b>PowerStation</b>	Page: <input type="checkbox"/> 1
Location: <input type="checkbox"/>	3.0.2C	Date: <input type="checkbox"/> 01-15-2002
Contract: <input type="checkbox"/>		SN: <input type="checkbox"/> TATAENERGY
Engineer: <input type="checkbox"/>		Revision: <input type="checkbox"/> Base
Filename: <input type="checkbox"/> matu	Study Case: LF	Config.: <input type="checkbox"/> Normal

**Electrical Transient Analyzer Program**  
**ETAP PowerStation**  
**Load Flow Analysis**  
 Loading Category: Design  
 Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 99  
 Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00  
 Unit System: Metric  
 Project Filename: matu  
 Output Filename: D:\PowerStn\matu\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	2.56	1.96	3.23	79.44 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	2.56	1.96	3.23	79.44 Lagging
Total Motor Load:	2.04	1.27	2.40	84.84 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.05	0.69		
System Mismatch:	0.08	0.03		

Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐

**PowerStation**

3.0.2C

Study Case: LF

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Date: ☐ 01-17-2002  
SN: ☐ TATAENERGY  
Revision: ☐ Base

Filename: ☐ majadar

Config.: ☐ Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 5

Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00

Unit System: English

Project Filename: majadar

Output Filename: D:\PowerStn\majadar\Untitled.lf1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	MW	Mvar	MVA	% PF
Swing Bus(es):	1.76	0.91	1.98	88.82 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	1.76	0.91	1.98	88.82 Lagging
Total Motor Load:	1.68	0.81	1.87	90.00 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.08	0.10		
System Mismatch:	0.01	0.00		

Project  
 Name  
 District  
 Engineer  
 Name

Power Station  
 No. 20

Study Case: LF

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 Revision: Base  
 Config: Normal

### SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Bus(es):	1.178	0.538	1.294	90.97 Lagging
Generators	.000	0.000	0.000	100.00 Lagging
Total Demand:	1.178	0.538	1.294	90.97 Lagging
Total Motor Load:	1.126	0.480	1.224	92.00 Lagging
Total Static Load:	0.000	0.000		
Apparent Losses:	0.051	0.058		
System Mismatch:	0.010	0.008		

Number of iterations: 2

Project	11 kV Rohika feeder From 66 kV	Power Station	Page:	12
Location	From Salarda S/S	30 DC	Date:	02-02-2002
Contract			SN:	TATAENERGY
Engineer:		Study Case: LF	Revision:	Base
Filename	Rohika11Kv		Config:	Normal

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#### SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Bus(es).	1.278	0.596	1.411	90.62 Lagging
Generators:	.000	0.000	0.000	100.00 Lagging
Total Demand:	1.278	0.596	1.411	90.62 Lagging
Total Motor Load:	1.201	0.512	1.306	92.00 Lagging
Total Static Load:	0.000	0.000		
Apparent Losses:	0.077	0.085		
System Mismatch:	0.016	0.010		

Number of iterations: 2



Project: <input type="checkbox"/>	<b>PowerStation</b>	Page: <input type="checkbox"/> 1
Location: <input type="checkbox"/>	3.0.2C	Date: <input type="checkbox"/> 01-15-2002
Contract: <input type="checkbox"/>		SN: <input type="checkbox"/> TATAENERGY
Engineer: <input type="checkbox"/>		Revision: <input type="checkbox"/> Base
Filename: <input type="checkbox"/> GDDC	Study Case: LF	Config.: <input type="checkbox"/> Normal

**Electrical Transient Analyzer Program**  
**ETAP PowerStation**  
**Load Flow Analysis**  
 Loading Category: Design  
 Normal Loading

Method of Solution: Newton-Raphson Method

Maximum Number of Iteration: 99  
 Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00  
 Unit System: Metric  
 Project Filename: GDDC  
 Output Filename: D:\PowerSrn\GDDC\Untitled.W1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	kw	kvar	kva	% PF
Swing Bus(es):	4042.10	2198.53	4601.39	87.80 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	4042.10	2198.53	4601.39	87.76 Lagging
Total Motor Load:	3544.60	1926.80	4034.50	87.90 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	497.50	271.73		
System Mismatch:	0.08	0.03		

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30.20

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Revision: Base  
Config: Normal

VIRAMGAM

Study Case: LF

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Bus(es)	4.188	2.072	4.673	89.63 Lagging
Generators:	.000	0.000	0.000	100.00 Lagging
Total Demand:	4.188	2.072	4.673	89.63 Lagging
Total Motor Load:	3.588	1.558	3.912	91.72 Lagging
Total Static Load:	0.000	0.000		
Apparent Losses:	0.600	0.514		
System Mismatch:	0.057	0.033		

Number of Iterations: 2



**Energy sent and consumption for the Identified feeders during the study period (sample case)**

Sr. No	Feeder	Circle	Energy Sent out kWh	Transformer Consumption kWh	Billed Energy kWh	Agricultural Consumption kWh	Total Consumption kWh
<b>Urban</b>							
1	Rajkamal	Mehsana	4059000	3761301	3284110	0	3284110
<b>Rural</b>							
2	Piludara	Mehsana	4718800	4158081	347834	3538872	3886706
3	Laxmipura	Mehsana	3724081	3376840	174779	3074647	3249426
4	Madhi	Mehsana	1612931	1546046	118690	1292438	1411128
5	B'Pura	Mehsana	1294630	1200240	188004	889849	1077853
6	Katpur	H'nagar	1749017	1339066	30236	1045529	1075765
7	Mahepura	H'nagar	2077987	1517235	27963	1444967	1472930
8	Pali	Palanpur	1849184	1762478	117613	1544804	1662417
9	Matu	Palanpur	2043579	1956056	55302	1625335	1680637
10	Majadar	Palanpur	1758509	1574176	178927	1372934	1551861
11	Lukhasan	Palanpur	3840430	3260791	101934	2892576	2994510
12	Rohika	Sabarmati	1848584	1741849	367018	1215822	1582840
<b>Industrial</b>							
13	GDCC	Sabarmati	4262361	4063274	3821685	26677	3848362
14	Viramgaon	Sabarmati	3820580	3400430	2887054	0	2887054

**Energy losses (Total, HT and LT) during the Study period (Sample case)**

Sr. No	Feeder	Circle	HT Losses (kWh)			LT Losses (kWh)			Total Energy Losses (kWh)		
			Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss
Urban											
1	Rajkamal	Mehsana	297699	168655	129044	477191	72766	404425	774890	241421	533469
Rural											
2	Piludara	Mehsana	560719	454121	106598	271375	195630	75745	832094	649751	182343
3	Laxmipura	Mehsana	347241	344950	2291	127414	44896	82518	474655	389846	84809
4	Madhi	Mehsana	66885	46115	20770	134918	18837	116081	201803	64952	136851
5	B'Pura	Mehsana	94390	54139	40251	122387	24613	97774	216777	78752	138025
6	Katpur	H'nagar	409951	55534	354417	263301	62965	200336	673252	118499	554753
7	Mahepura	H'nagar	560752	129958	430794	44305	29456	14849	605057	159414	445643
8	Pali	Palanpur	86706	79294	7412	100061	43243	56818	186767	122537	64230
9	Matu	Palanpur	87523	66597	20926	275419	133313	142106	362942	199910	163032
10	Majadar	Palanpur	184333	75614	108719	22315	18607	3708	206648	94221	112427
11	Lukhasan	Palanpur	579639	157986	421653	266281	97216	169065	845920	255202	590718
12	Rohika	Sabarmati	106735	90064	16671	159009	24414	134595	265744	114478	151266
Industrial											
13	GDDC	Sabarmati	199087	180895	18192	214912	90285	124627	413999	271180	142819
14	Viramgaon	Sabarmati	420150	344083	76067	513376	6408	506968	933526	350491	583035

Agricultural consumption for the study period and projection for year 2000-01 (identified feeders)

Sr. No	Feeder	Circle	During study period				During 2000-01		
			Actual Agricultural Load, HP (MRI)	Energy sent out , kWh	Assessed agricultural consumption kWh	Agricultural consumption/HP (Actual)	Energy sent out , kWh	Assessed agricultural consumption kWh	Agricultural consumption/HP (Actual)
Rural									
1	Piludara	Mehsana	3500	4718800	3538872	1011	9954106	11003970	3144
2	Laxmipura	Mehsana	2509	3724081	3074647	1225	5576985	5221229	2081
3	Madhi	Mehsana	1528	1612931	1292438	846	5569940	4463458	2922
4	B'Pura	Mehsana	1111	1294630	889849	801	3325379	2285662	2057
5	Katpur	H'nagar	1347	1749017	1045529	776	6612057	3952562	2935
6	Mahepura	H'nagar	2303	2077987	1444967	627	9467500	6583401	2858
7	Pali	Palanpur	1962	1849184	1544804	787	6598508	5512379	2810
8	Matu	Palanpur	1720	2043579	1625335	945	6327578	5032560	2926
9	Majadar	Palanpur	2526	1758509	1372934	544	6829684	5332190	2111
10	Lukhasan	Palanpur	1136	3840430	2892576	2546	5068177	3817304	3360
11	Rohika	Sabarmati	1704	1848584	1215822	714	1848584	8348057	4899

**Number of Agricultural consumers connected on selected feeders DTs and LT-HT ratio**

Feeder Name	Number of Transformer with one Ag consumer	Number of Transformer with two Ag consumers	Number of Transformer with more than two Ag consumers	Total HT Length	Total LT length	LT/HT ratio
<b><u>Rural</u></b>						
Piludara	53	-	-	35.12	119.41	3.4
Laxmipura	51	1	-			
Madhi	11	6	2	7.7	2.31	0.3
B'Pura	11	3	3	14.1	8.46	0.6
Katpur	11	1	16	12.48	6.24	0.5
Mahepura	23	13	22	20.7	12.42	0.6
Pali	20	-	-	3.7	0.74	0.2
Matu	9	7	30	27.49	21.99	0.8
Majadar	18	9	11	19.37	9.69	0.5
Lukhasan	14	6	13	17.67	7.07	0.4
Rohika	14	6	13	17.67	8.84	0.5

Capacity wise number of transformers on selected feeders

Capacity/feeders	Piludara	Laxmipura	Madhi	B'Pura	Katpur	Mahepura	Pali	Matu	Majadar	Lukhasan	Rohika	Viramgaon	GDPC
kVA													
25	3	0	0	1	6	16	1	12	5	4	9	5	8
50		4	5	3	4	3	0	0	1	4	6	8	1
63	22	35	8	10	22	28	6	17	13	16	33	0	15
100	40	13	8	8	14	10	19	17	17	10	10	87	28
200							1					16	8
400												3	1
450												1	
500												1	
Total	65	52	21	22	46	57	27	46	36	34	58	121	61



List of meters on various feeders where operating load was found more than the sanctioned load

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
Central Zone					
<b>B'pura</b>					
1	23034	22.38	41.40	19.02	85%
2	23142	14.92	81.00	66.08	443%
3	23119	22.38	36.00	13.62	61%
4	22436	26.11	67.50	41.39	159%
5	905532	22.38	36.00	13.62	61%
6	905228	22.38	35.10	12.72	57%
7	22407	41.03	90.00	48.97	119%
8	23140	22.38	45.00	22.62	101%
9	22435	44.76	72.00	27.24	61%
10	23009	22.38	41.40	19.02	85%
<b>Laxmipura</b>					
1	21958	38.79	58.00	19.21	50%
2	21625	46.25	65.00	18.75	41%
3	22297	37.30	60.00	22.70	61%
4	23091	46.25	66.00	19.75	43%
5	23074	26.11	40.00	13.89	53%
6	22227	29.84	48.00	18.16	61%
7	GEBO1898	22.38	33.01	10.63	48%
8	GEBO1920	22.38	33.25	10.87	49%
<b>Madhi</b>					
1	20/5	52.22	90	37.78	72%
2	26/2	14.92	46.8	31.88	214%
3	33/a/1	52.22	79.2	26.98	52%
4	59/1	29.84	72.9	43.06	144%
5	62/7	22.38	37.8	15.42	69%
6	64/2	22.38	95.4	73.02	326%
7	66	11.19	30	18.81	168%
8	66/6	22.38	63	40.62	182%

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
9	76	30.586	68.4	37.81	124%
10	81	26.11	40	13.89	53%
<b>Majadar</b>					
1	1959599	18.65	34.58	15.93	85%
<b>Mahepura</b>					
1	1960254	11.19	36.74	25.55	228%
2	1960257	7.46	39.91	32.45	435%
3	1960170	11.19	47.68	36.49	326%
4	1960042	14.92	34.51	19.59	131%
5	1960127	33.57	53.31	19.74	59%
6	1960174	11.19	15.92	4.73	42%
7	1960249	14.92	27.21	12.29	82%
<b>Pali</b>					
1	23894	46.25	96.00	49.75	108%
2	23893	53.71	98.00	44.29	82%
3	23629	53.71	96.00	42.29	79%
4	23864	44.76	104.00	59.24	132%
5	23964	6.71	18.00	11.29	168%
6	24006	3.73	13.00	9.27	249%
7	23960	22.38	44.00	21.62	97%
8	23962	7.46	54.00	46.54	624%
9	23632	55.95	100.00	44.05	79%
10	23970	5.97	16.00	10.03	168%
11	23961	38.79	68.00	29.21	75%
<b>Piludara</b>					
1	21502	46.25	73.71	27.46	59%
2	21506	38.79	59.94	21.15	55%

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
3	21896	41.03	60.75	19.72	48%
4	21315	22.38	33.21	10.83	48%
5	21387	44.76	67.23	22.47	50%
6	22224	14.92	71.28	56.36	378%
7	22527	38.79	55.08	16.29	42%
8	22232	46.25	73.71	27.46	59%
<b>Matu</b>					
1	959670538-22549	9.41	26.00	16.59	176%
2	959670506-22548	11.19	17.00	5.81	52%
3	94690-22552	14.92	22.00	7.08	47%
4	959670503-22550	31.71	60.00	28.30	89%
5	959670511-22505	11.41	32.00	20.59	180%
<b>Rohika</b>					
1	1961130	16.4	20.0	3.6	22.0%
2	1961129	22.4	39.2	16.9	75.4%
3	1961126	41.0	100.0	59.0	144.1%
4	90270	18.6	24.8	6.2	33.3%
5	1961111	11.2	20.5	9.3	83.4%
6	1960118	14.9	30.0	15.1	101.3%
7	1961109	22.4	32.0	9.7	43.2%
8	1960022	38.6	70.0	31.4	81.4%
9	90315	16.8	24.2	7.5	44.5%
10	1961131	26.1	37.0	10.9	41.9%
11	1961129	22.4	37.5	15.2	67.8%
12	90287	41.0	53.5	12.5	30.4%
13	1960116	18.6	29.0	10.4	55.7%
14	22449	48.4	62.2	13.8	28.5%

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
15	1960119	7.5	69.0	61.6	826.2%
16	22418	22.4	40.3	18.0	80.3%
17	24027	18.6	28.0	9.4	50.3%
18	1961168	22.4	30.3	8.0	35.7%
19	1960216	18.6	25.0	6.4	34.2%
20	1960003	5.6	9.0	3.4	61.1%
21	1960007	9.3	25.0	15.7	168.5%
22	1960233	11.2	26.6	15.5	138.3%
23	1961132	22.4	36.0	13.7	61.1%
<b>Lukhasan</b>					
1	23943	11.2	23.1	11.9	85.8%
2	23769	18.7	36.0	17.4	73.7%
3	23693	33.6	48.5	14.9	30.0%
4	23744	14.9	30.0	15.1	81.0%
5	23816	18.7	30.0	11.4	44.8%
6	23819	70.9	108.3	37.4	37.5%
7	23757	26.1	53.0	26.9	82.7%
8	23776	18.7	37.2	18.6	79.7%
9	23830	31.3	48.0	16.7	37.9%
10	23763	11.2	42.6	31.4	242.2%
11	23746	29.8	40.5	10.7	22.1%
12	2369	22.4	55.7	33.4	124.2%
13	23893	41.0	69.2	28.2	51.9%
<b>Katpur</b>					
1	1959861	18.7	29.0	10.4	55.5%
2	1959517	11.2	15.0	3.8	34.0%
3	1959859	11.2	22.0	10.8	96.6%
4	1959520	11.2	16.0	4.8	43.0%
5	1959524	11.2	15.0	3.8	34.0%
6	1959683	45.9	53.0	7.1	15.5%
7	1959701	36.6	74.0	37.4	102.4%

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
8	1961052	69.0	86.0	17.0	24.6%
9	1959521	14.9	27.0	12.1	81.0%
10	1959863	37.3	59.0	21.7	58.2%
11	1959518	11.2	15.0	3.8	34.0%
12	1959547	11.2	14.0	2.8	25.1%
13	1959697	44.8	67.0	22.2	49.7%
14	1959699	11.2	22.0	10.8	96.6%
15	1961072	69.0	90.0	21.0	30.4%
16	1961069	56.0	83.0	27.1	48.3%
17	1961070	37.3	100.0	62.7	168.1%
18	1959862	22.4	32.0	9.6	43.0%
19	1959685	39.2	54.0	14.8	37.9%
20	1959702	46.6	65.0	18.4	39.4%
21	1959864	18.7	27.0	8.4	44.8%
22	1961051	74.6	104.0	29.4	39.4%
23	1960665	65.3	105.0	39.7	60.9%
24	1959859	11.19	20.00	8.81	79%

Feeder	Total number of Transformer	Number of Transformer with Higher Load	Percentage
Rural			
Piludara	65	8	12%
Laximpura	52	8	15%
Madhi	21	10	48%
B'Pura	22	10	45%
Katpur	46	24	52%
Mahepura	57	7	12%
Pali	27	11	41%
Matu	46	5	11%
Majadar	36	1	3%
Lukhasan	34	13	38%
Rohika	58	23	40%

Category wise consumption for the North Zone during year 2000-01

Category	Total Sent out	Total billed energy	Agricultural assessment	Total Consumption	Agricultural Consumption/ HP	Total technical energy loss	Total commercial loss	Total energy loss
	MU	MU	MU	MU		MU	MU	MU
Rural	7630	130	6647	6777	2377	686	167	853
Urban	718	526		526		47	145	192
Industrial	996	811		811		78	107	185
HTEX	777	696		696		1	80	81
Total	10121	2163	6647	8810	2377	812	499	1311



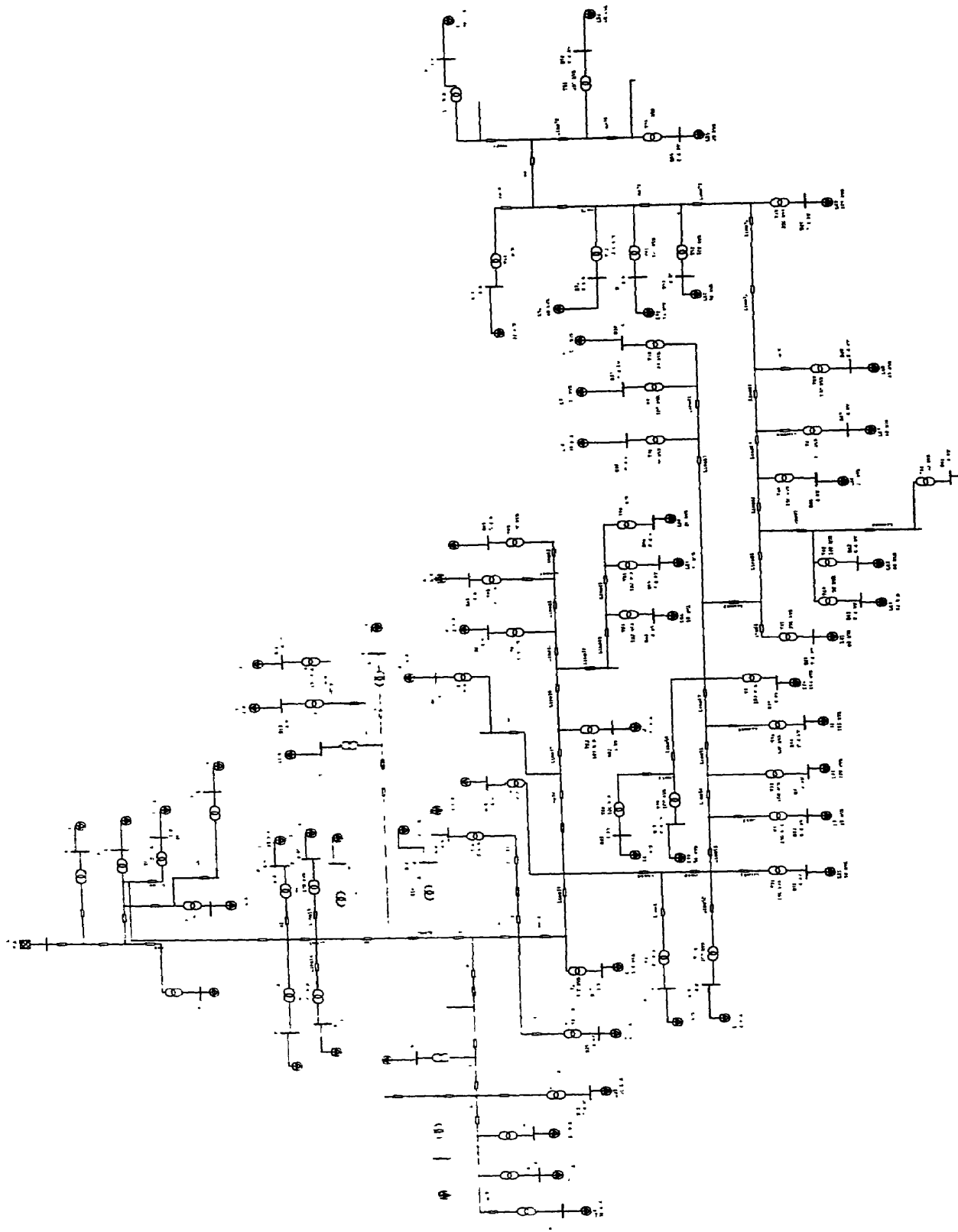
## **Distribution System Central Zone**

- ⇒ *One Line Diagram of the 11 kV network*
- ⇒ *Load Flow Summary Report*
- ⇒ *Energy Losses and Agricultural Consumption*
- Sample Case*
- ⇒ *Transformers and Agricultural Consumers*
- ⇒ *Sanctioned Demand Analysis*
- ⇒ *Summery for the Zone*

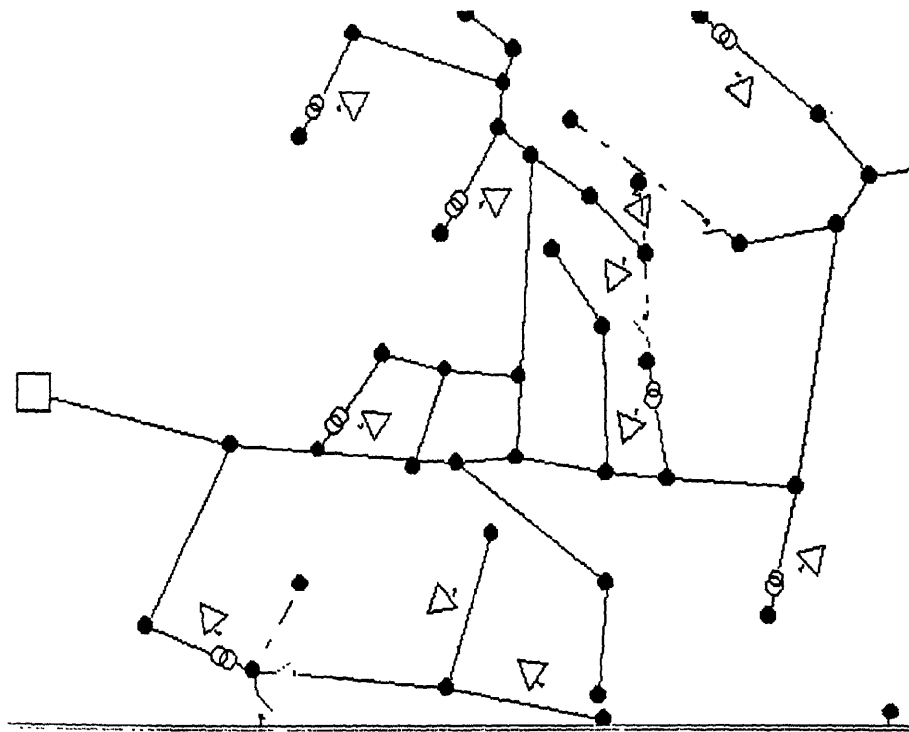




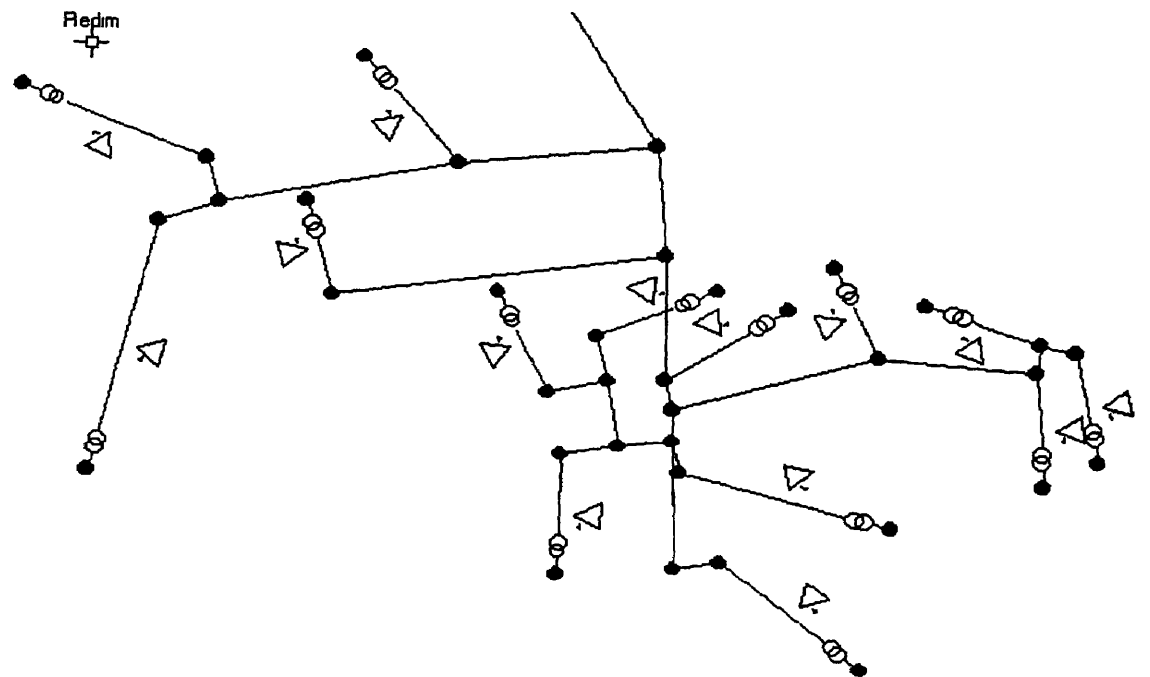




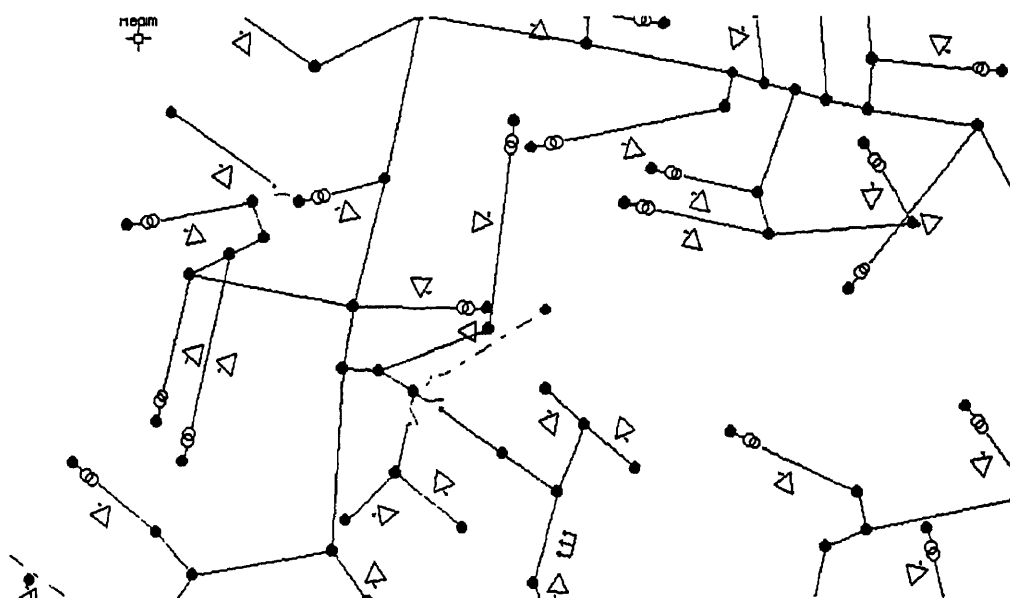
One Line Diagram of Feeder : Gothaj



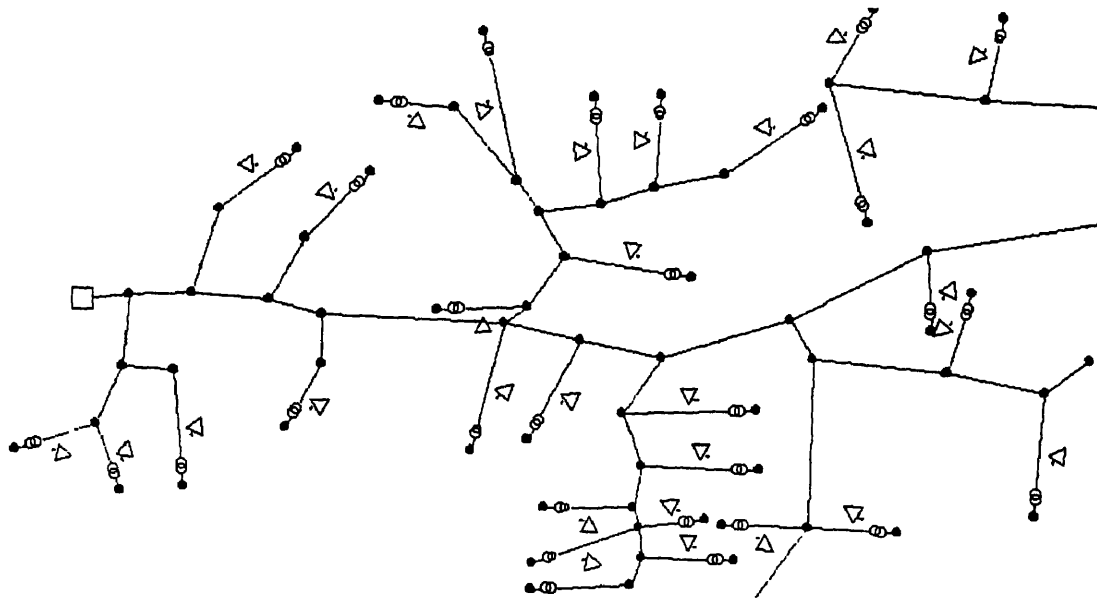
One Line Diagram of Feeder : Gothaj



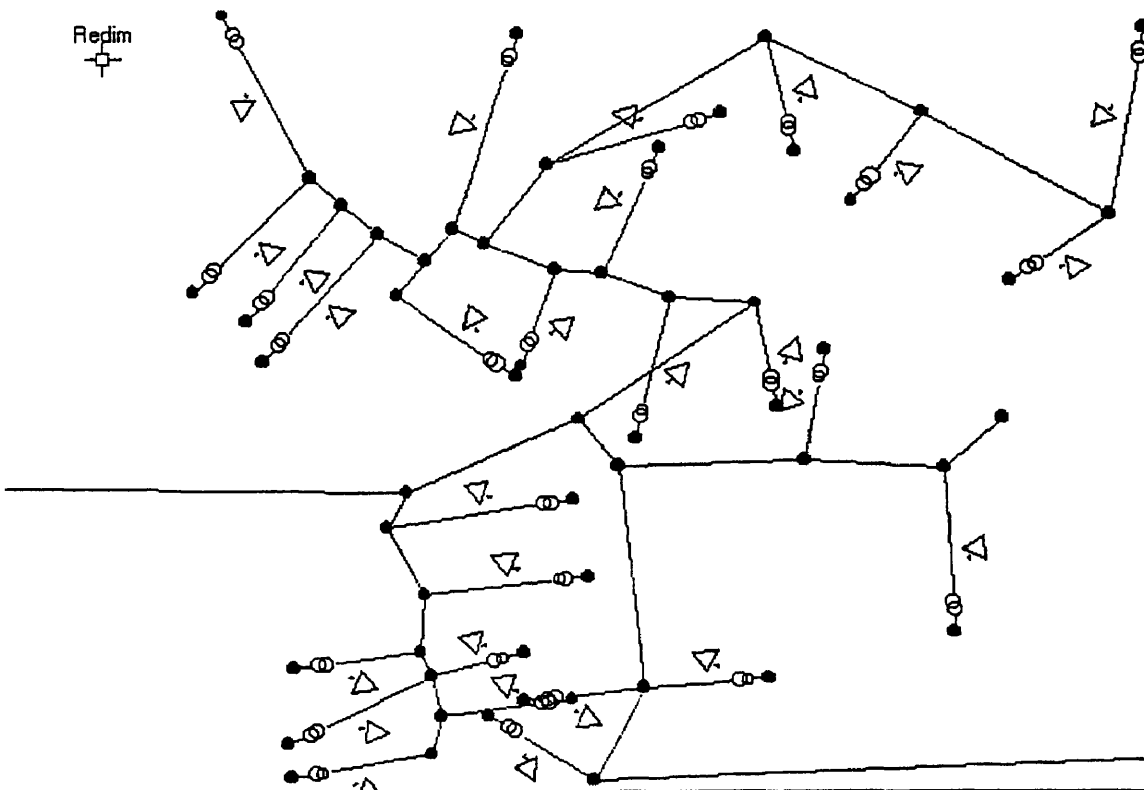
gothaj2 (783x423x16M jpeg)



bhoj1 (783x424x16M jpeg)  
One Line Diagram of Feeder Bhoj

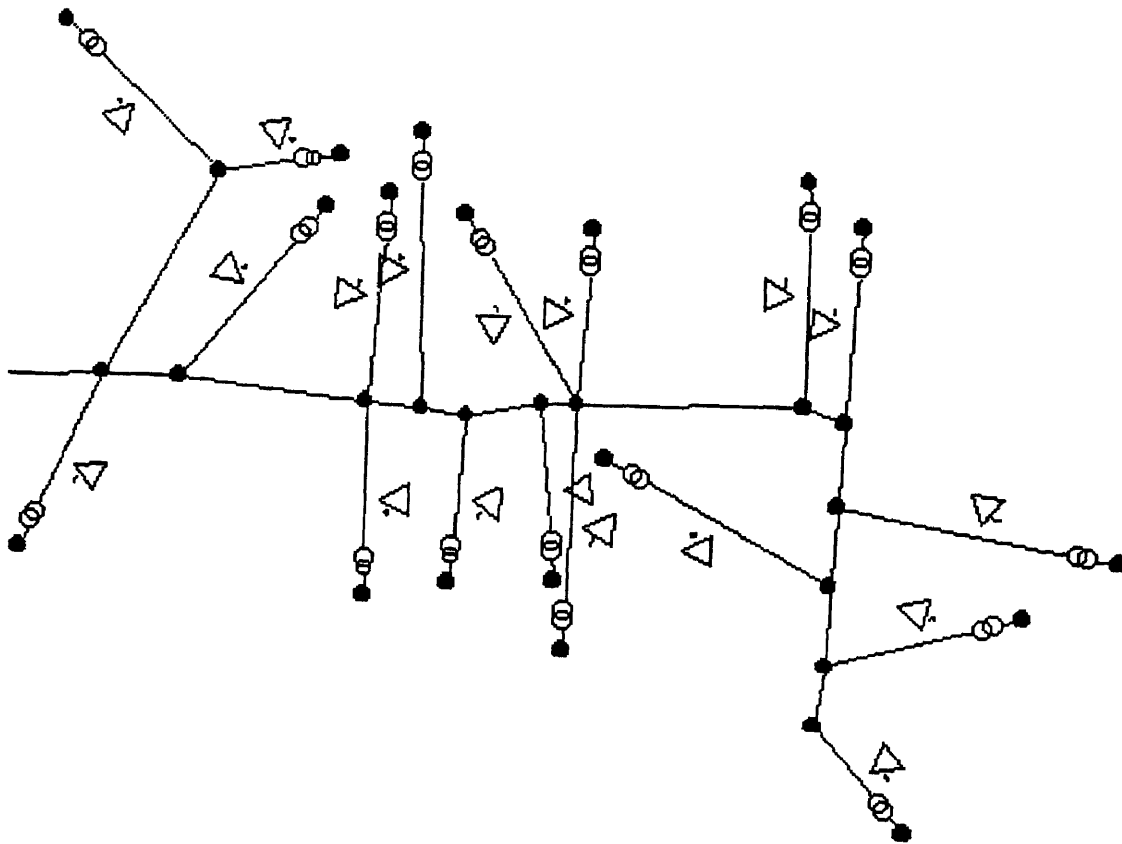


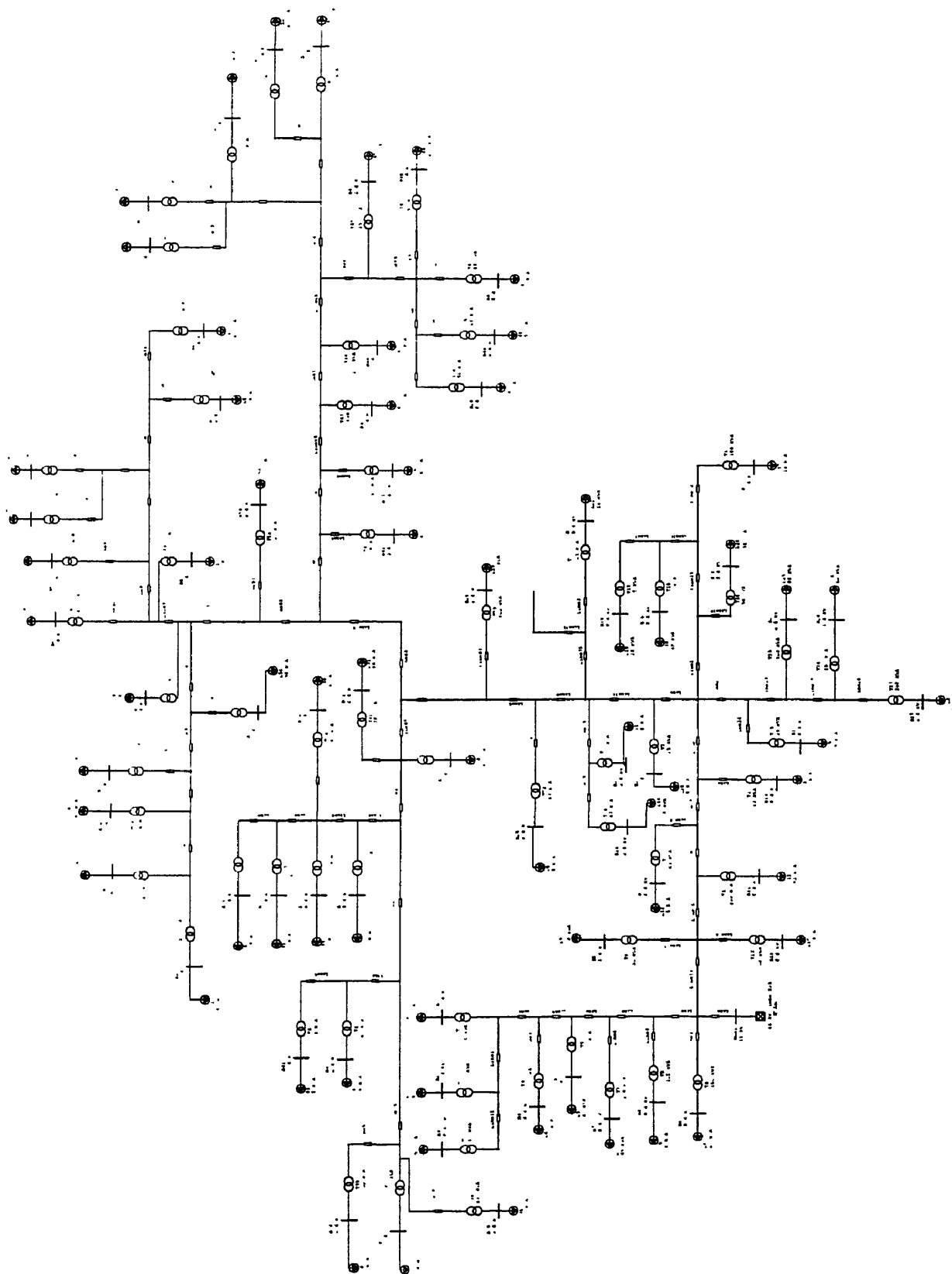
bhoj2 (596x426x16M jpeg)  
one line diagram of feeder Bhoj



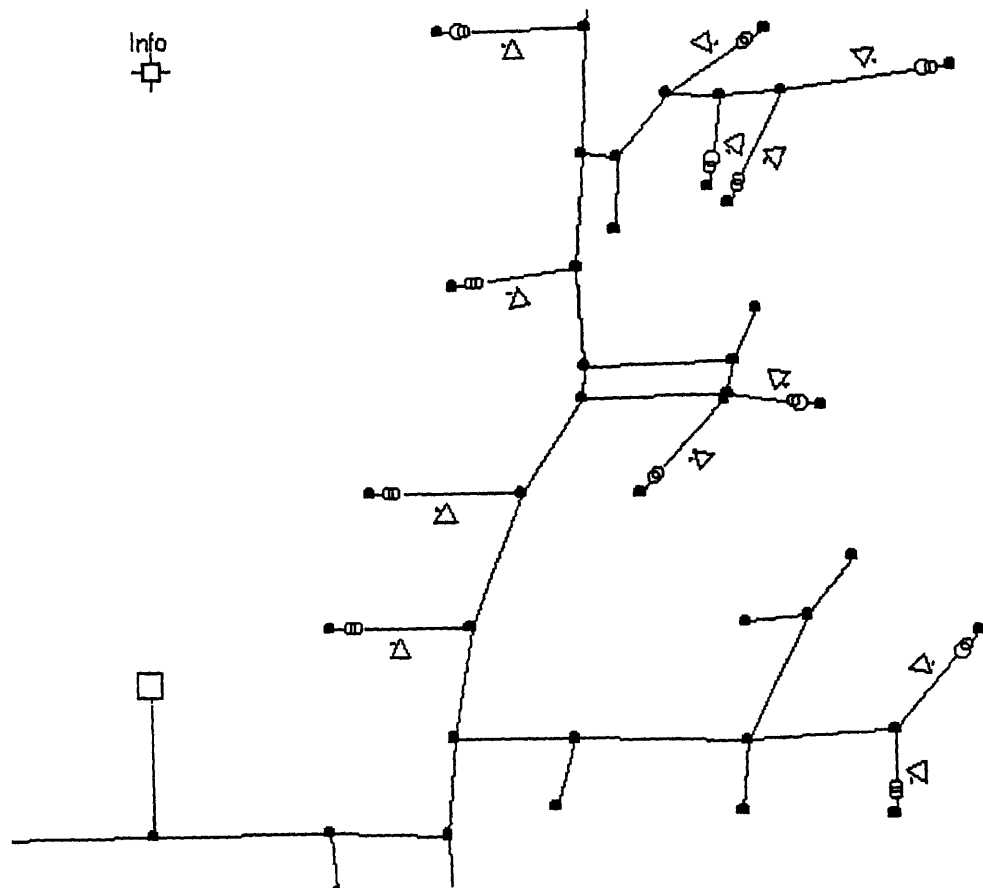


bhoj3 (447x346x16M jpeg)  
One line diagram of Feeder Bhoj

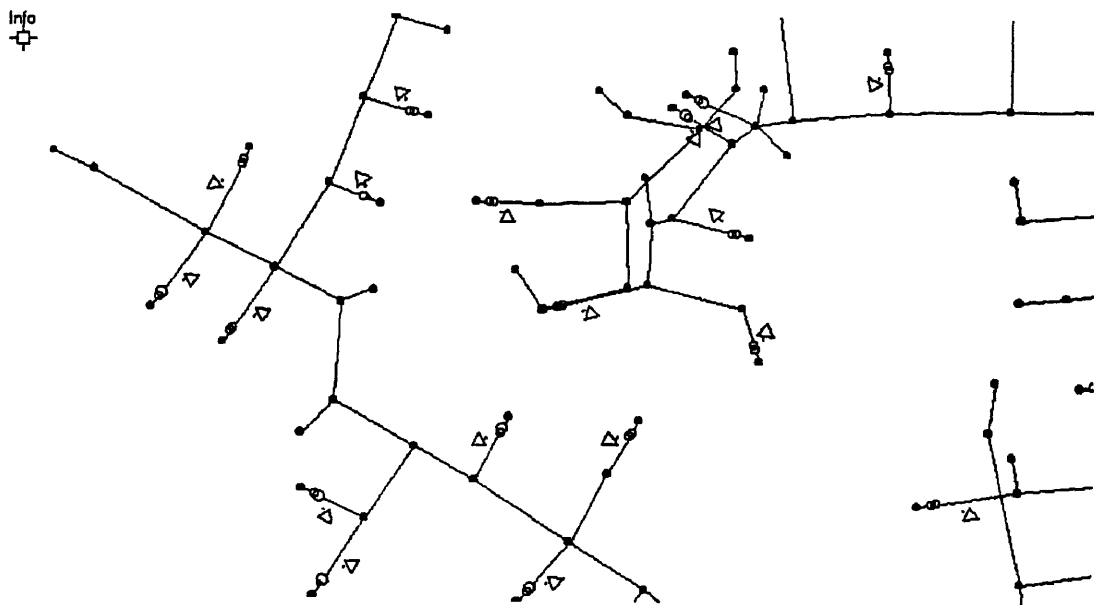




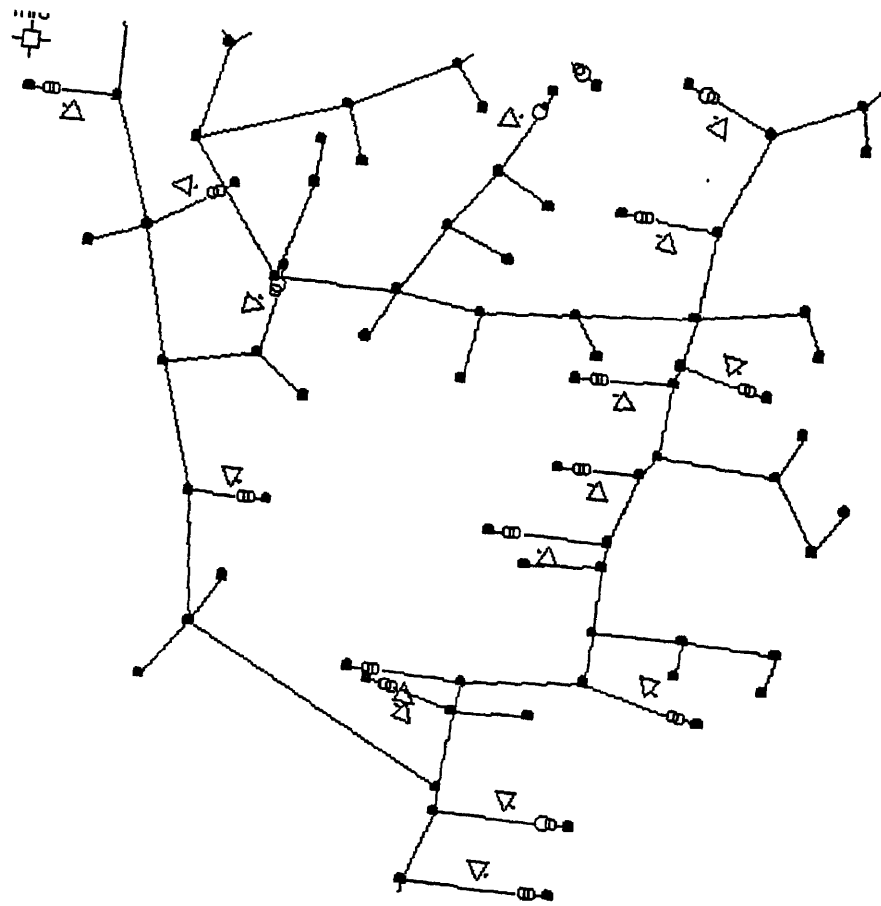
One Line Diagram of Feeder : Ranoli



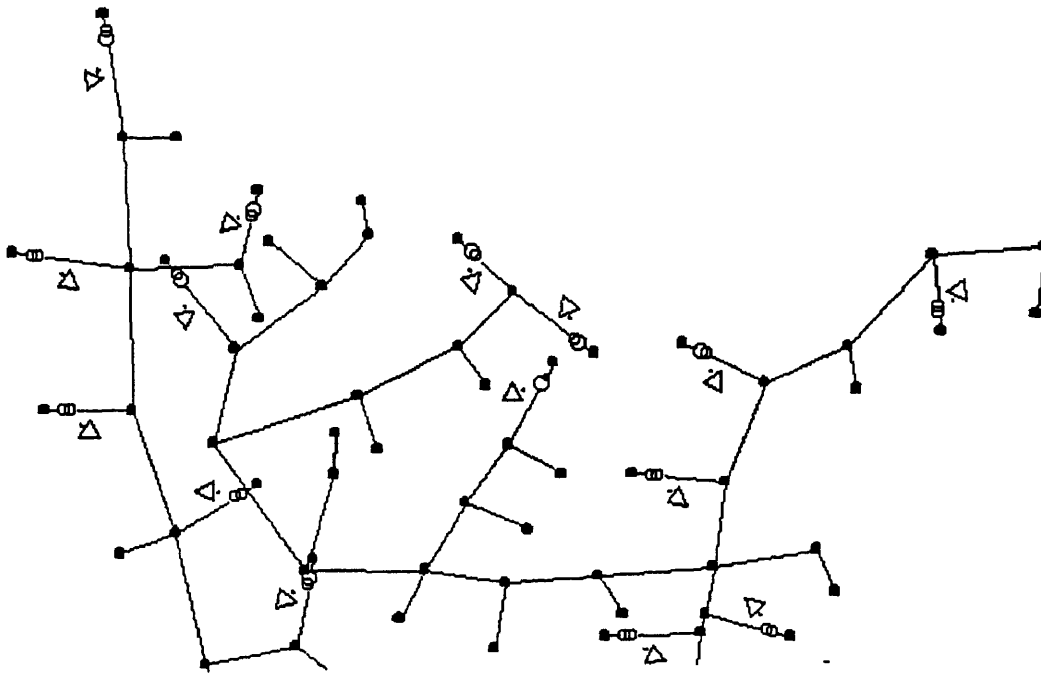
One Line Diagram of Feeder : Ranoli



One Line Diagram of Feeder : Ranoli



One Line Diagram of Feeder : Ranoli



Project:  
Location:

Contract:  
Engineer:

Filename: Anandcity-I

# **ETAP PowerStation**

4.0.0C

Study Case: LF

Page: 1  
Date: 12-03-2002

SN: TATAENERGY  
Revision: Base

Config.: Normal

## **Electrical Transient Analyzer Program**

### **ETAP PowerStation**

#### **Load Flow Analysis**

Loading Category: Design

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>				
Number of Buses:	1	0	215	216				

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Is</u>
Number of Branches:	90	0	0	125	0	0	2

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution: 0.000100  
System Frequency: 50.00

Unit System: Metric

Project Filename: Anandcity-I

Output Filename: C:\ETAP 400\PowerStation\GEB\Anandcity-I\Anand.Ifl

## **SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es):		4.247	2.771	5.071	83.75 Lagging
Generators:		0.000	0.000	0.000	100.00 Lagging
Total Demand:		4.247	2.771	5.071	83.75 Lagging
Total Motor Load.		4.091	2.498	4.793	85.34 Lagging
Total Static Load.		0.001	0.000		
Apparent Losses.		0.156	0.273		
System Mismatch.		0.000	0.000		

Project	ETAP PowerStation	Page: 1
Location	4.0.0C	Date: 01-05-2002
Contract		SN: TATAENERGY
Engineer		Revision: Base
Filename: SVG	Study Case: LF	Config.: Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**  
**Load Flow Analysis**

Loading Category: Design

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>			
Number of Buses	1	0	141	142			

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	61	0	0	80	0	0	141

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99  
Precision of Solution: 0.000100

System Frequency: 50.00  
Unit System: Metric  
Project Filename: SVG

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es)	2.992	2.271	3.756	79.65	Lagging
Generators	0.000	0.000	0.000	100.00	Lagging
Total Demand:	2.992	2.271	3.756	79.65	Lagging
Total Motor Load:	2.913	2.109	3.596	81.00	Lagging
Total Static Load:	0.000	0.000			
Apparent Losses:	0.079	0.162			
System Mismatch:	0.000	0.000			



Project: ☐  
 Location: ☐  
 Contract: ☐  
 Engineer: ☐  
 Filename: ☐Gothaj

### PowerStation

3.0.2C

Study Case: LF

Page: ☐1  
 Date: ☐01-05-2002  
 SN: ☐TATAENERGY  
 Revision: ☐Base  
 Config.: ☐Normal

### Electrical Transient Analyzer Program ETAP PowerStation Load Flow Analysis Loading Category: Design Normal Loading

	Swing	Generator	Load	Total			
Number of Buses:	1	0	120	121			
	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	50	0	0	70	0	0	122
Method of Solution: Fast-Decoupled Method							

Maximum Number of Iteration: 5  
 Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00  
 Unit System: Metric  
 Project Filename: Gothaj  
 Output Filename: D:\GEBT&D\T&D\LTstudy\Central Zone\central\gothaj\Untitled.If1

### SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Bus(es):	1.67	0.91	1.90	87.93 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	1.67	0.94	1.90	87.93 Lagging
Total Motor Load:	1.55	0.75	1.73	89.95 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.12	0.25		
System Mismatch:	0.00	0.00		

Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐  
  
Filename: ☐Bhoj

PowerStation

3.0.2C

Study Case: LF

Page: ☐1  
Date: ☐01-05-2002  
SN: ☐TATAENERGY  
Revision: ☐Base  
  
Config.: ☐Normal

Electrical Transient Analyzer Program

ETAP PowerStation

Load Flow Analysis

Loading Category: Design

Normal Loading

Swing

Generator

Load

Total

Number of Buses: 1 0 194 195

XFMR2

XFMR3

Reactor

Line/Cable

Impedance

Tie PD

Total

Number of Branches: 62 0 0 70 0 0 122

Method of Solution: Fast-Decoupled Method

Maximum Number of Iteration: 5

Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00

Unit System: Metric

Project Filename: Bhoj

Output Filename: D:\GEBT&D\T&D\LTstudy\Central Zone\Central\Bhoj\Untitled.lf1

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Bus(es):	2.46	1.33	2.80	87.93 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	2.46	1.36	2.80	87.93 Lagging
Total Motor Load:	2.30	1.12	2.55	89.95 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.17	0.25		
System Mismatch:	0.00	0.00		

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 05-01-2002
Contract:		SN: TATAENERGY
Engineer:	Study Case: LF	Revision: Base
Filename: Nadisar		Config.: Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Number of Buses:	<u>Swing</u> 1	<u>Generator</u> 0	<u>Load</u> 168	<u>Total</u> 169			
Number of Branches:	<u>XFMR2</u> 67	<u>XFMR3</u> 0	<u>Reactor</u> 0	<u>Line/Cable</u> 99	<u>Impedance</u> 0	<u>Tie PD</u> 2	I

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution 0.000100

System Frequency: 60.00

Unit System: Metric

Project Filename: Nadisar

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es):	2.376	1.047	2.596	91.51	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand:	2.376	1.047	2.596	91.51	Lagging
Total Motor Load:	2.177	0.858	2.340	93.03	Lagging
Total Static Load:	0.000	0.000			
Apparent Losses:	0.199	0.189			
System Mismatch:	0.000	0.000			

Project: ☐  
 Location: ☐  
 Contract: ☐  
 Engineer: ☐  
 Name: ☐ Ranoli

# PowerStation

3.0.2C

Study Case: LF

Page: ☐ 1  
 Date: ☐ 01-05-2002  
 SN: ☐ TATAENERGY  
 Revision: ☐ Base  
 Config.: ☐ Normal

## Electrical Transient Analyzer Program

### ETAP PowerStation

### Load Flow Analysis

Loading Category: Design

Normal Loading

Number of Buses: Swing 1 Generator 0 Load 122 Total 123  
XFMR2 XFMR3 Reactor Line/Cable Impedance Tie PD Total  
 Number of Branches: 52 0 0 70 0 0 122  
 Method of Solution: Fast-Decoupled Method

Maximum Number of Iteration: 5  
 Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00

Unit System: Metric

Project Filename: Ranoli

Output Filename: D:\GEBT&D\T&D\LTstudy\Central Zone\Central\Ranoli\Unbtded.lf1

### SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Bus(es):	2.36	1.28	2.68	87.93 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	2.36	1.31	2.68	87.93 Lagging
Total Motor Load:	2.24	1.09	2.49	89.95 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.11	0.08		
System Mismatch:	0.00	0.00		



Energy sent and consumption for the identified feeders during the study period (sample case)

Sr. No	Feeder	Circle	Energy Sent out kWh	Transformer Consumption kWh	Billed Energy kWh	Agricultural Consumption kWh	Total Consumption kWh
<b>Urban</b>							
1	Anand City 1	Anand	10363126	9897228	7167456	0	7167456
2	S V G	Anand	6766400	6512353	4393545	0	4393545
<b>Rural</b>							
3	Gothaj	Anand	4555204	4227710	558114	3184949	3743063
4	Bhoj	Baroda	3716672	3449740	223550	2643958	2867508
5	Nadisar	Godhra	5820520	5055480	1045292	1473325	2518617
<b>Industrial</b>							
6	Ranoli	Baroda	5817434	5525681	4569320	0	4569320
7	Transpeck	Baroda	1054545	1010093	1010093	0	1010093

Energy losses (Total, HT and LT) during the Study period (Sample case)

Sr. No	Feeder	Circle	HT Losses (kWh)			LT Losses (kWh)			Total Energy Losses (kWh)		
			Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss
Urban											
1	Anand City 1	Anand	465898	415689	50208	2729772	275028	2454745	3195670	690717	2504953
2	S V G	Anand	254047	230560	23487	2118808	125767	1993041	2372855	356327	2016527
Rural											
3	Gothaj	Anand	327493	287322	40171	484648	76068	408579	812141	363390	448750
4	Bhoj	Baroda	266932	231942	34989	582232	42354	539878	849164	274297	574867
5	Nadisar	Godhra	765041	475133	289907	2536863	280622	2256240	3301903	755756	2546147
Industrial											
6	Ranoli	Baroda	291753	240257	51496	956360	283312	673049	1248113	523569	724544
7	Transpeck	Baroda	44452	40050	4402	0	0	0	44452	40050	4402

**Agricultural consumption for the study period and projection for year 2000-01 (Identified feeders)**

|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Number of Agricultural consumers connected on selected feeders DTs and LT-HT ratio

Feeder Name	Number of Transformer with one Ag consumer	Number of Transformer with two Ag consumers	Number of Transformer with more than two Ag consumers	Total HT Length	Total LT length	LT/HT ratio
<b><i>Rural</i></b>						
Bhoj	17	16	18	35	33.54	1.0
Gothaj	10	8	30	32	45.46	1.4
Nadisar	9	7	25	67	152	2.3
<b><i>Industrial</i></b>						
Anand City 1	-	-	-	16	67	4.1
SVG	-	-	-	7	35	5.0



Capacity wise number of transformers on selected feeders

Capacity/feeders	Bhof	Gothaj	Nadisar	Ranolli	Anand City 1	SVG
kVA						
25	11	17	13	2	3	-
50	1	1	4	2	-	-
63	28	22	19	26	14	7
75	22	1	-	-	1	-
100	-	9	32	47	52	42
200	-	-	-	16	19	10
250	-	-	-	1	-	-
300	-	-	-	-	1	0
400	-	-	-	-	1	0
500	-	-	-	-	1	3
Total	62	50	68	94	92	62

List of meters on various feeders where operating load was found more than the sanctioned load

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
Central Zone					
<b>Nadisar</b>					
1	01960596	24.92	74.4	49.48	198.6%
2	01960337	55.95	66.96	11.01	19.7%
3	01960514	31.48	37.2	5.72	18.2%
4	01960590	22.38	35.34	12.96	57.9%
5	01960515	69.72	83.7	13.98	20.1%
6	01960344	52.22	74.4	22.18	42.5%
7	01959645	13.06	16.74	3.69	28.2%
8	01959648	14.92	16.74	1.82	12.2%
9	01960511	48.46	50.22	1.76	3.6%
10	01960465	44.76	74.4	29.64	66.2%
<b>Gothaj</b>					
1	1959988	11.19	15	3.81	34%
2	1959996	25.345	30	4.655	18%
3	1959963	19.023	22	2.977	16%
4	1959960	39.165	63	23.835	61%
5	1959959	18.32	27	8.68	47%
6	1961400	25.5132	32	6.4868	25%
7	1959954	7.46	15	7.54	101%
8	1959970	15.295	20	4.705	31%
9	1959972	18.65	35	16.35	88%
10	1959949	63.415	72	8.585	14%
11	1959971	16.785	20	3.215	19%
12	1959973	67.645	70	2.355	3%
13	1959967	14.92	20	5.08	34%
14	1959969	16.785	23	6.215	37%
15	1959966	37.3	44	6.7	18%
16	1959979	11.19	16	4.81	43%
17	1959941	44.83	54	9.17	20%
18	1959980	11.19	15	3.81	34%

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
19	1959955	18.65	22	3.35	18%
<b>Bhoj</b>					
1	01960640	41.03	48.00	6.97	17%
2	01960641	37.30	45.00	7.70	21%
3	01960533	29.84	40.00	10.16	34%
4	01960385	16.92	27.00	10.08	60%
5	01960496	41.03	49.00	7.97	19%
6	01960637	37.30	44.00	6.70	18%
7	1960538	29.84	48.00	18.16	61%
8	01960540	41.03	50.00	8.97	22%
9	01960361	41.03	46.00	4.97	12%
10	01960363	14.92	25.00	10.08	68%
11	01959673	11.19	27.13	15.94	142%
12	01960364	18.65	28.00	9.35	50%
13	01960644	29.84	30.00	0.16	1%
14	01959678	20.65	32.00	11.35	55%
15	01959675	14.92	26.00	11.08	74%
16	01960487	37.30	45.00	7.70	21%
17	01960384	15.92	22.00	6.08	38%
18	01960535	14.92	27.30	12.38	83%
19	01960493	33.57	41.00	7.43	22%
20	01960572	15.92	26.50	10.58	66%
21	01960639	46.03	49.00	2.97	6%
22	01960357	29.84	39.00	9.16	31%
23	01960490	11.19	77.00	65.81	588%

Feeder	Total number of Transformer	Number of Transformer with Higher Load	Percentage
<b>Rural</b>			
Nadisar	68	10	15%
Gothaj	50	19	38%
Bhoj	64	23	36%

Category wise consumption for the Central Zone during year 2000-01

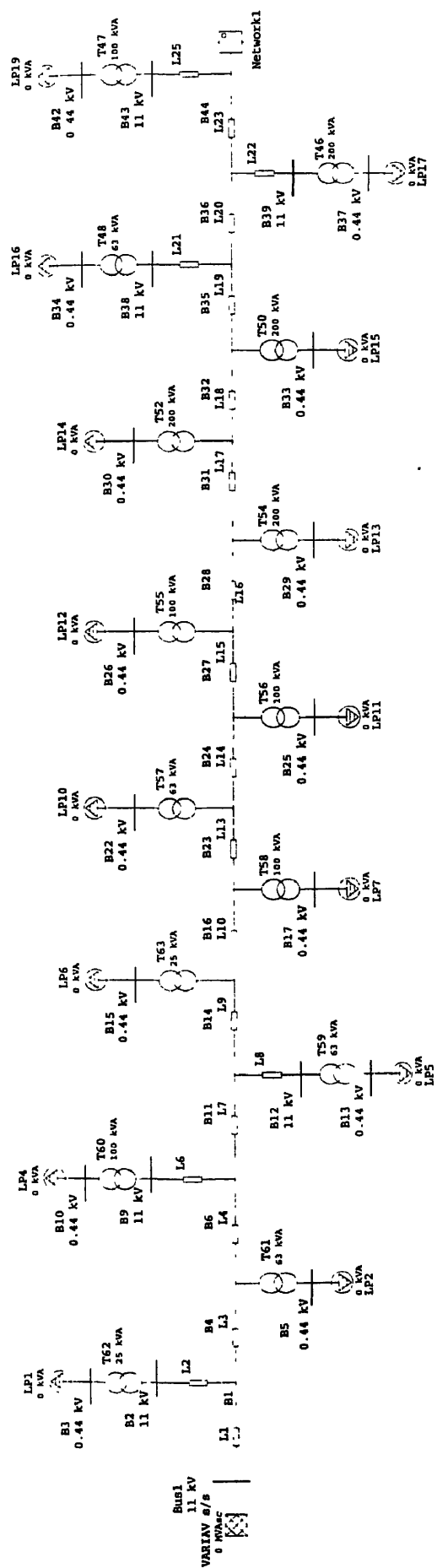
Category	Total Sent out	Total billed energy	Agricultural assessment	Total Consumption	Agricultural Consumption/ HP	Total technical energy loss	Total commercial loss	Total energy loss
	MU	MU	MU	MU		MU	MU	MU
Rural	1786	207	925	1132	1775	210	444	654
Urban	1417	898		898		96	423	519
Industrial	544	381		381		50	113	163
HTEX	279	247	0	247		3	29	32
Total	4026	1733	925	2658	1775	358	1010	1368



## **Distribution System South Zone**

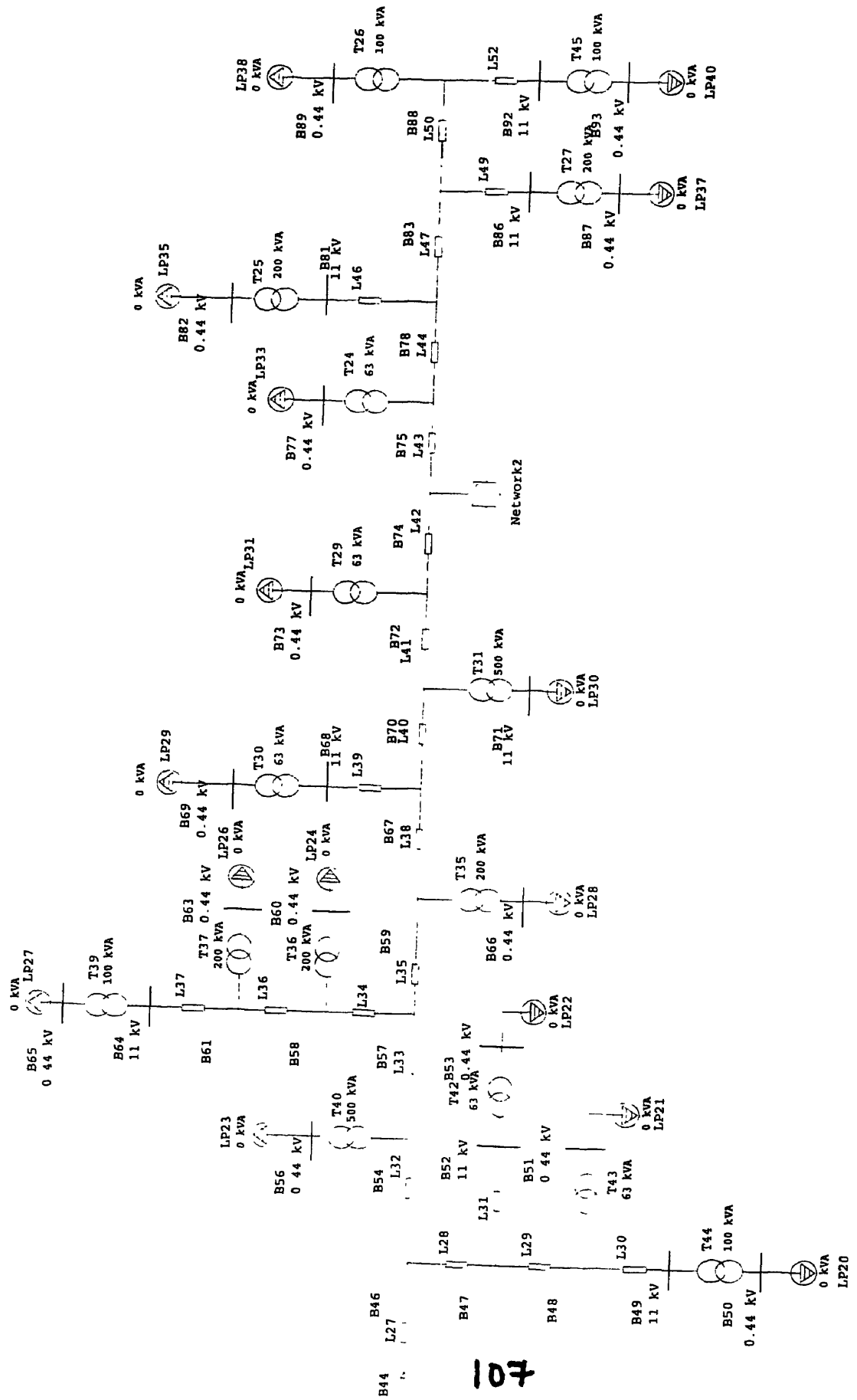
- ⇒ *One Line Diagram of the 11 kV network*
- ⇒ *Load Flow Summary Report*
- ⇒ *Energy Losses and Agricultural Consumption*
- Sample Case*
- ⇒ *Transformers and Agricultural Consumers*
- ⇒ *Sanctioned Demand Analysis*
- ⇒ *Summary for the Zone*

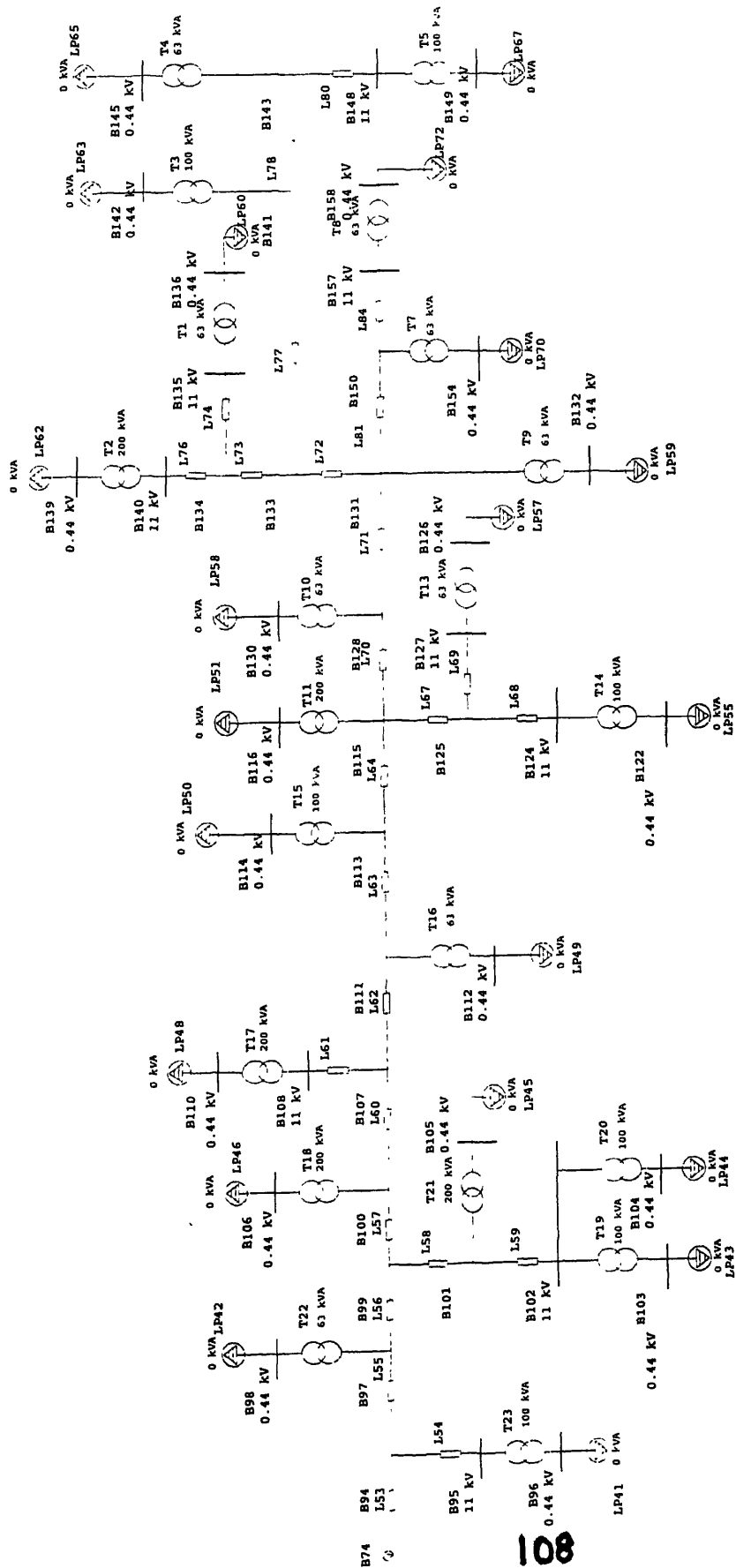




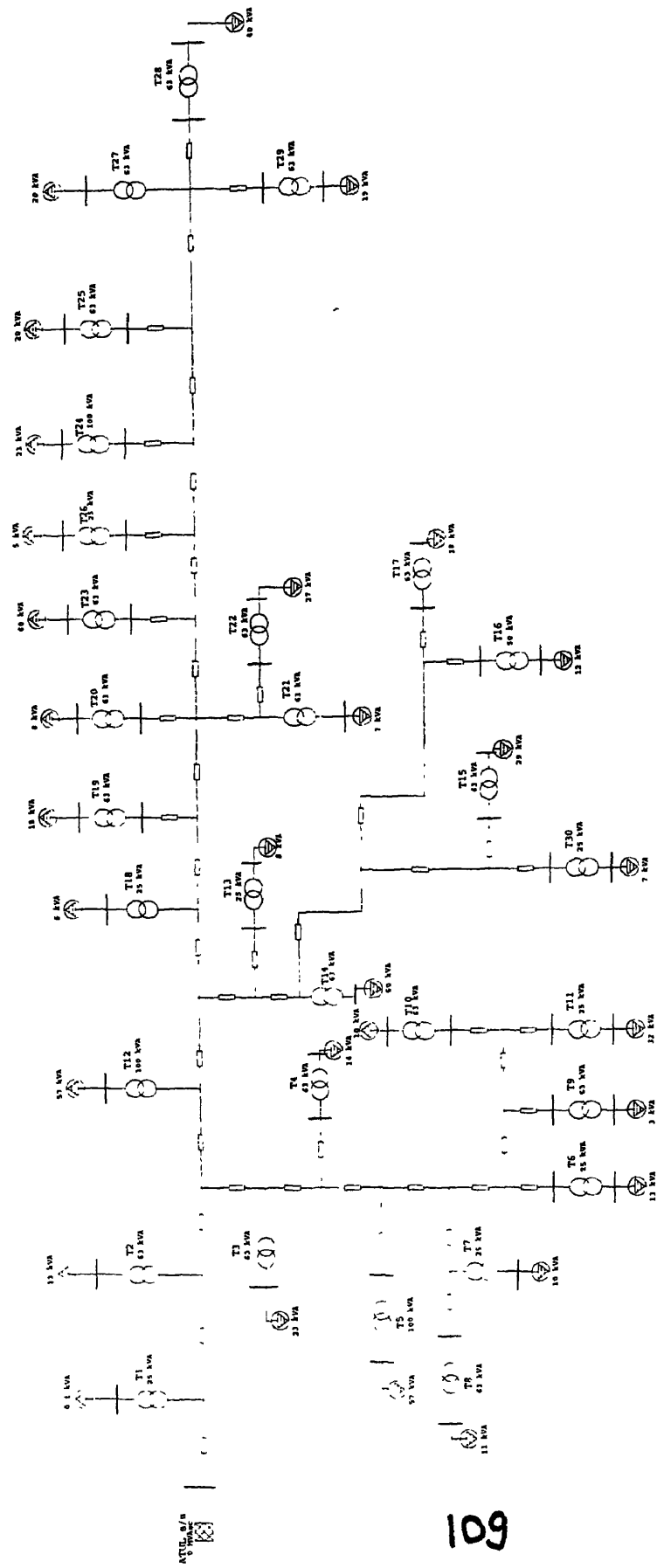
106

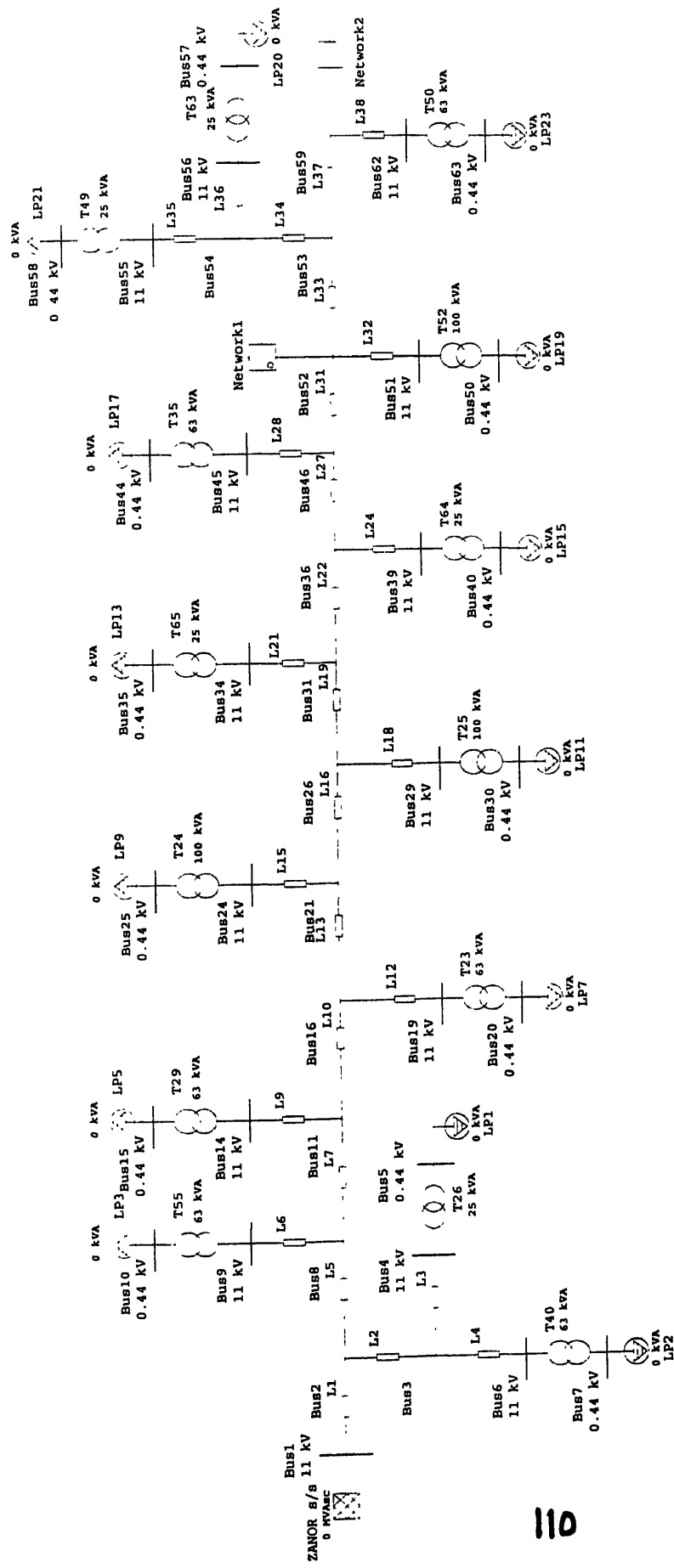






# One-Line Diagram - OLV1



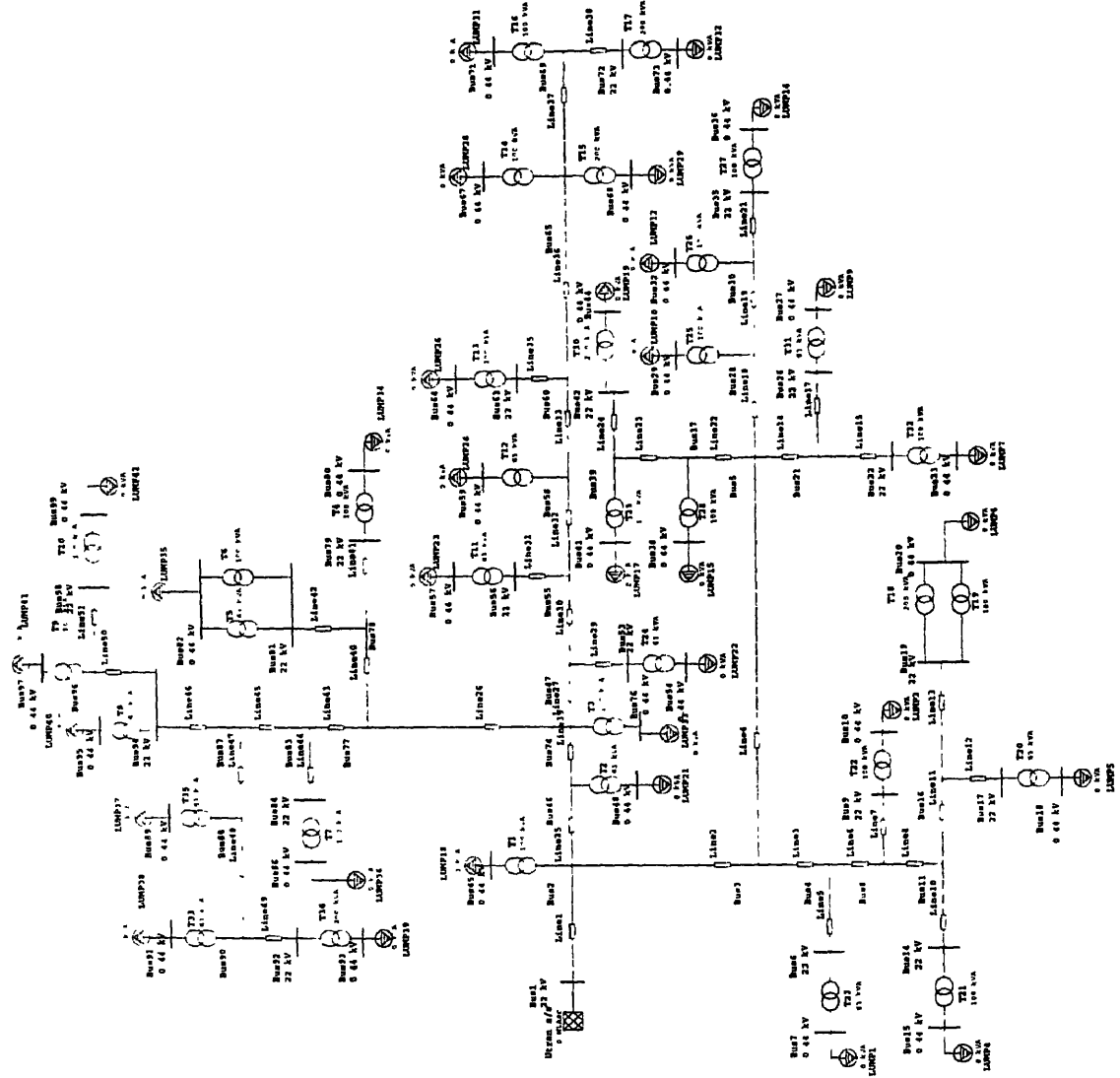


# One-Line Diagram - OLV1=>Network1



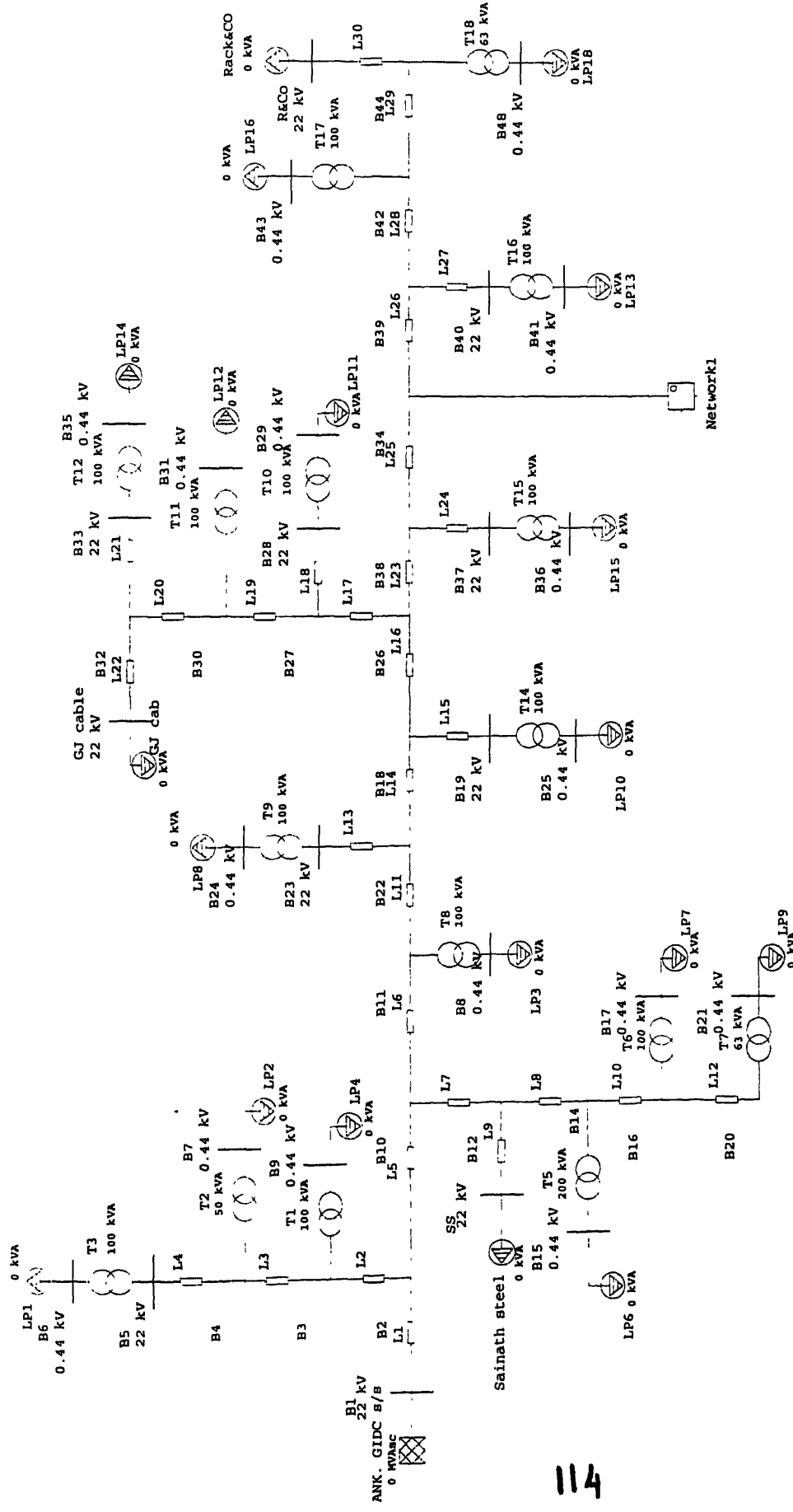


# One-Line Diagram - OLV1



113

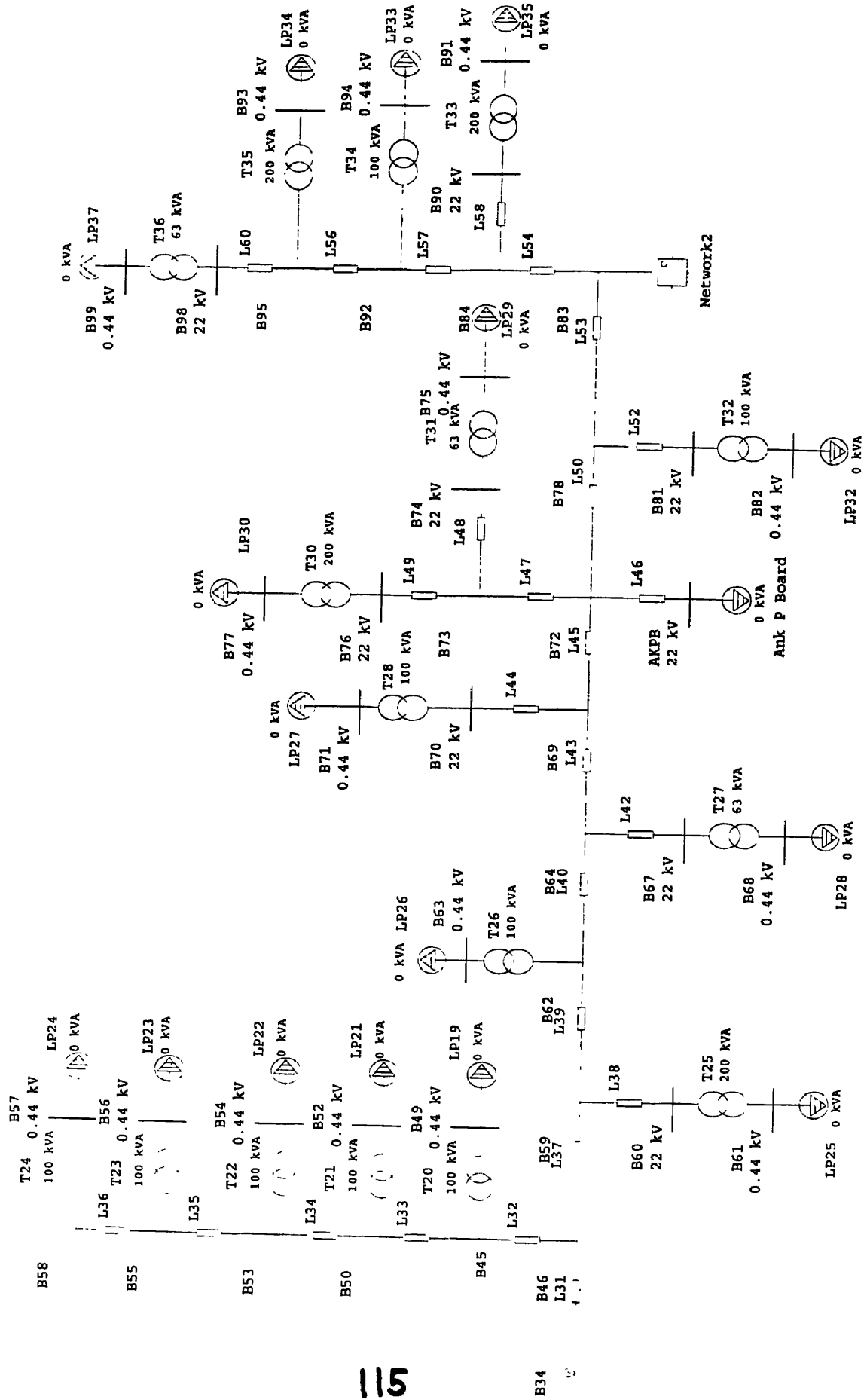
# One-Line Diagram - OLV1

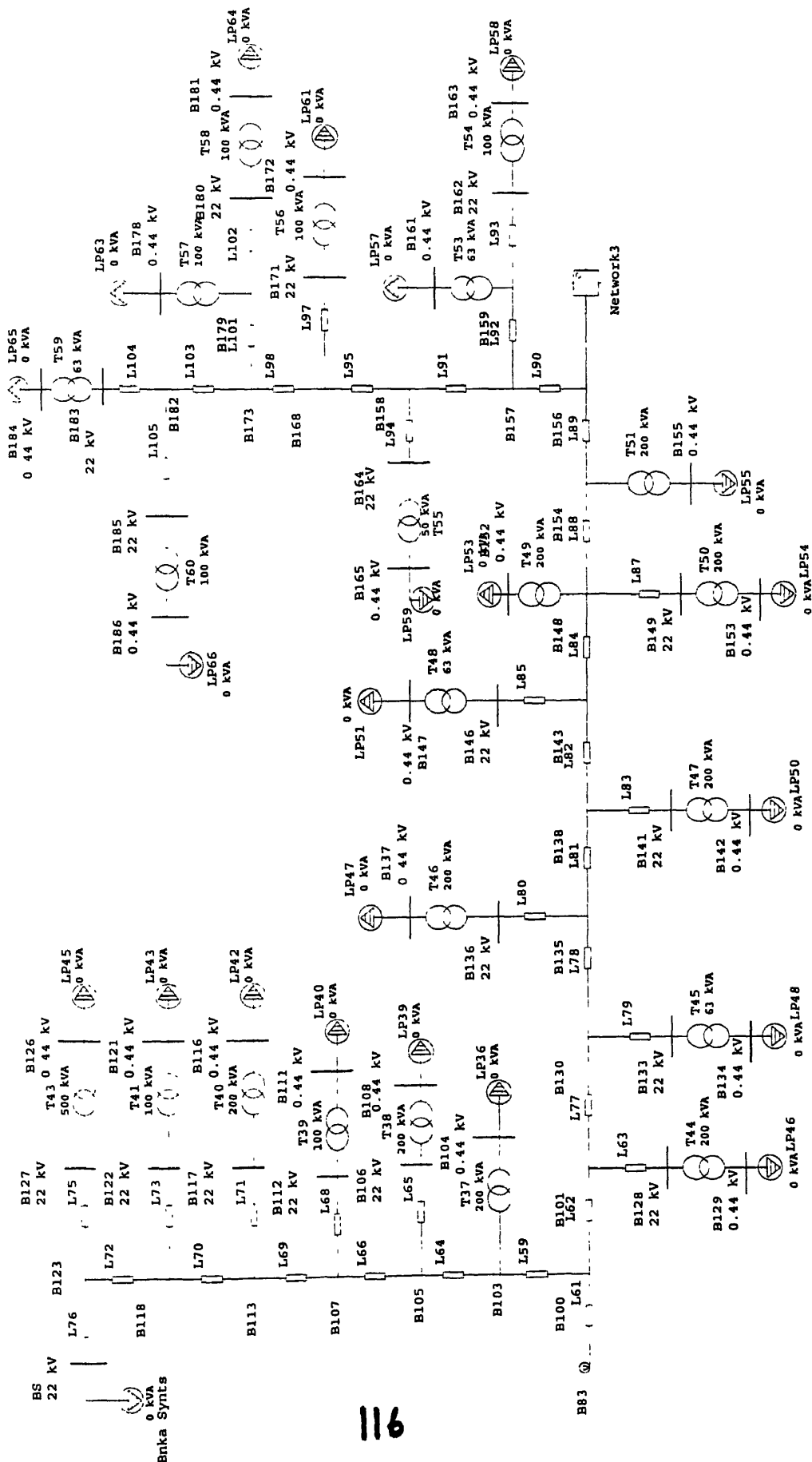


114

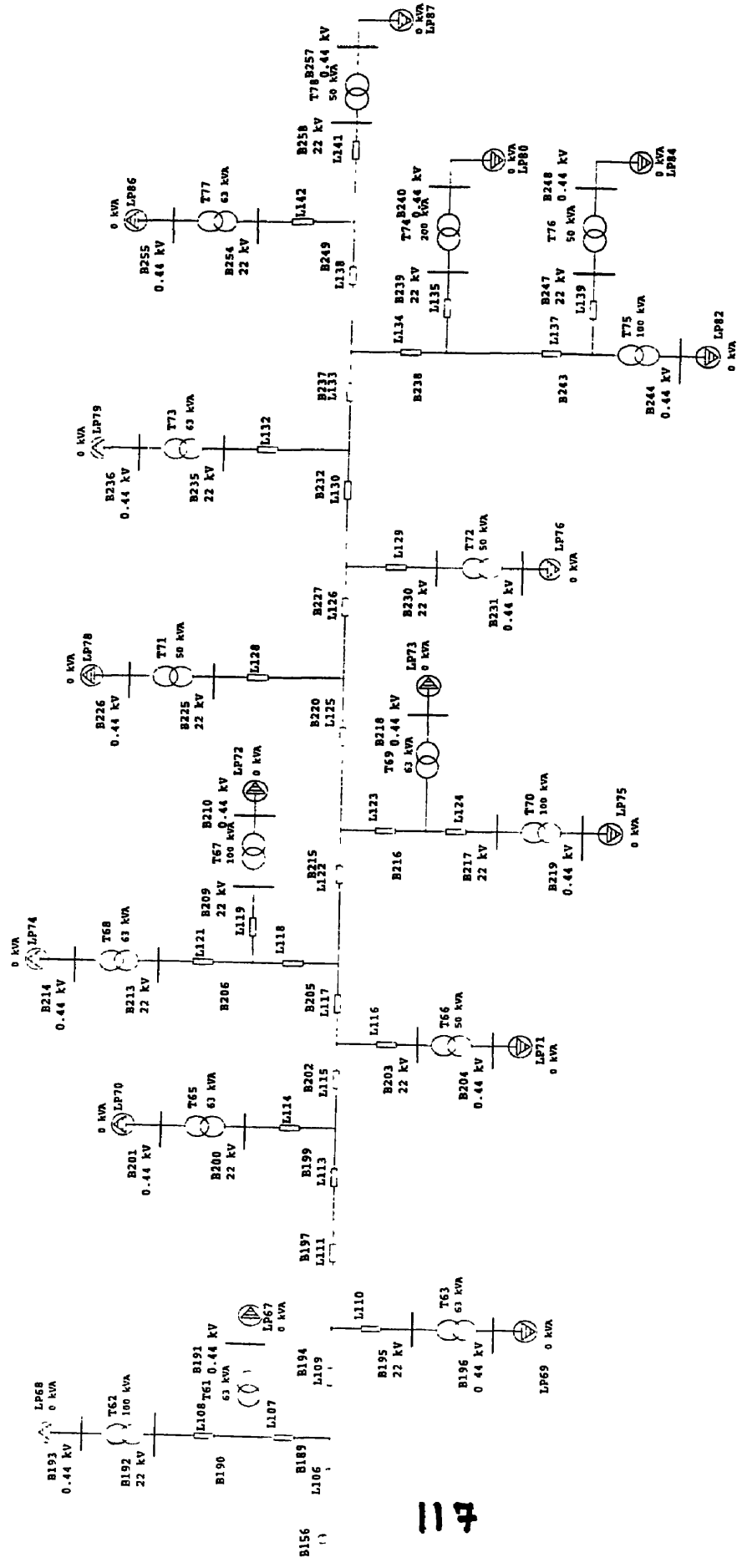


## One-Line Diagram - OLV1=>Network1





# One-Line Diagram - OLV1=>...=>Network3



**PowerStation**

Project: ☐  
Location: ☐  
Contract: ☐  
Engineer: ☐

3.0.2C

Study Case: LF

Filename: ☐ Navyug

Page: ☐ 1  
Date: ☐ 01-05-2002  
SN: ☐ TATAENE  
Revision: ☐ Base  
Config.: ☐ Normal

**Electrical Transient Analyzer Program****ETAP PowerStation****Load Flow Analysis**

Loading Category: Design

Normal Loading

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>			
Number of Buses:	1	0	122	123			
	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	52	0	0	70	0	0	122
Method of Solution:	Fast-Decoupled Method						

Maximum Number of Iteration: 5

Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00

Unit System: Metric

Project Filename: Navyug

Output Filename: D:\GEBT&amp;D\T&amp;D\LTstudy\SouthZone\Surat\Navyug\Untitled.If1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Swing Bus(es):	2.48	1.34	2.82	87.93 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	2.48	1.37	2.82	87.93 Lagging
Total Motor Load:	2.31	1.12	2.56	89.95 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.18	0.25		
System Mismatch:	0.00	0.00		

Number of Iterations: 3

Project:	ETAP PowerStation	Page: 1
Location	4.0.0C	Date: 05-01-2002
Contract:		
Engineer:		SN. TATAENERGY
	Study Case: LF	Revision: Base
Filename: Rabda		Config.: Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

	Loading Category: Design						
	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>			
Number of Buses	1	0	78	79			
	<u>XFMR2</u>	<u>XFMR1</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Ti</u>
Number of Branches	30	0	0	48	0	0	
Method of Solution	Newton-Raphson Method						
Maximum No. of Iteration	5						
Precision of Solution	0.001000						
System Frequency	50.00						
Unit System	Metric						
Project Filename	Rabda						

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>		
Swing Bus(es)	0.750	0.382	0.842	89.10	Lagging	0.89101494
Generators	0.000	0.000	0.000	100.00	Lagging	
Total Demand	0.750	0.382	0.842	89.10	Lagging	
Total Motor Load	0.723	0.350	0.803	90.00	Lagging	
Total Static Load:	0.000	0.000				
Apparent Losses	0.027	0.032				
System Mismatch	0.000	0.000				

ETAP PowerStation

Project:  
Location  
  
Contract  
Engineer  
  
Filename: Pariej

4 0 0C

Page: 1  
Date: 01-05-2002

SN: TATAENERGY  
Revision: Base

Study Case: LF

Config.: Normal

Electrical Transient Analyzer Program

ETAP PowerStation

Load Flow Analysis

Loading Category: Design

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>
Number of Buses:	1	0	170	171

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	63	0	0	107	0	0	170

Method of Solution: Newton-Raphson Method

Maximum No. of Iteration: 5

Precision of Solution: 0.001000

System Frequency: 50.00

Unit System: Metric

Project Filename: Pariej

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es)	2.186	0.945	2.382	91.80	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand:	2.186	0.945	2.382	91.80	Lagging
Total Motor Load:	2.088	0.825	2.245	93.00	Lagging
Total Static Load:	0.000	0.000			
Apparent Losses:	0.098	0.120			
System Mismatch:	0.000	0.000			

Project: ☐  
 Location: ☐  
 Contract: ☐  
 Engineer: ☐  
 Filename: ☐Amroli

**PowerStation**

3.0.2C

Study Case: LF

Page: ☐1  
 Date: ☐01-05-2002  
 SN: ☐TATAENERGY  
 Revision: ☐Base  
 Config.: ☐Normal

**Electrical Transient Analyzer Program**

**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Normal Loading

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>			
Number of Buses:	1	0	109	110			
	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches:	35	0	0	40	0	0	122

Method of Solution: Fast-Decoupled Method

Maximum Number of Iteration: 5  
 Precision of Solution: 0.001000 MW and Mvar

System Frequency: 50.00  
 Unit System: Metric  
 Project Filename: Amroli  
 Output Filename: D:\GEBT&D\T&D\LTstudy\SouthZone\Surat\Amroli\Untitled.If1

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Swing Bus(es):	2.08	1.13	2.37	87.93 Lagging
Generators:	0.00	0.00	0.00	100.00 Lagging
Total Demand:	2.08	1.16	2.37	87.93 Lagging
Total Motor Load:	2.06	1.00	2.29	89.95 Lagging
Total Static Load:	0.00	0.00		
Apparent Losses:	0.03	0.02		
System Mismatch:	0.00	0.00		

Project	ETAP PowerStation	Page: 1
Location	4 0.0C	Date: 01-05-2002
Contract		SN: TATAENERGY
Engineer		Revision: Base
	Study Case LF	
Filename: FeederNo11		Config.: Normal

Electrical Transient Analyzer Program

ETAP PowerStation

**Load Flow Analysis**

Loading Category Design

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>
Number of Buses	1	0	197	198

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	70	0	0	127	0	0	197

Method of Solution: Newton-Raphson Method

Maximum No of Iteration 5

Precision of Solution: 0.001000

System Frequency: 50.00

Unit System: Metric

Project Filename: FeederNo11

Output Filename: C:\ETAP 400\PowerStation\GEB\FeederNo11\Feeder11.lfi

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es)	2.636	1.473	3.020	87.30	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand:	2.636	1.473	3.020	87.30	Lagging
Total Motor Load:	2.603	1.411	2.961	87.92	Lagging
Total Static Load:	0.000	0.000			
Apparent Losses:	0.033	0.062			
System Mismatch:	0.000	0.000			





## **Distribution System West Zone 1**

- ⇒ *One Line Diagram of the 11 kV network*
- ⇒ *Load Flow Summary Report*
- ⇒ *Energy Losses and Agricultural Consumption*
- Sample Case*
- ⇒ *Transformers and Agricultural Consumers*
- ⇒ *Sanctioned Demand Analysis*
- ⇒ *Summery for the Zone*



Energy sent and consumption for the identified feeders during the study period (sample case)

Sr. No	Feeder	Circle	Energy Sent out kWh	Transformer Consumption kWh	Billed Energy kWh	Agricultural Consumption kWh	Total Consumption kWh
<b>Urban</b>							
1	Navyug	Surat	5494400	5172372	3310540	0	3310540
<b>Rural</b>							
2	Rabda	Valsad	1940400	1782741	398465	1131962	1530427
3	Palej	Baruch	5026427	4466019	561783	3240275	3802058
<b>Industrial</b>							
4	Amroli	Surat	10127553	9941146	5485685	322864	5808549
5	Feeder No. II	Surat	8256600	6770599	4165433	0	4165433
<b>HT Express</b>							
6	ParasPetro	Surat	4244570	4140876	4140876	0	4140876
7	GJ Apar	Baruch	4760502	4559698	4559698	0	4559698

Feeder wise losses (Total, HT and LT) during the Study period (Sample case)

Sr. No	Feeder	Circle	HT Losses kWh			LT Losses kWh			Total Energy Losses kWh		
			Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss
<b>Urban</b>											
1	Navyug	Surat	322028	312739	9288	1861832	411029	1450803	2183860	723768	1460091
<b>Rural</b>											
2	Rabda	Valsad	157659	80897	76762	252314	42167	210147	409973	123064	286909
3	Palej	Baruch	560408	255561	304847	663962	263085	400877	1224370	518645	705725
<b>Industrial</b>											
4	Amroli	Surat	186407	161248	25159	4132596	323873	3808724	4319003	485119	3833884
5	Feeder No. II	Surat	1486001	182594	1303407	2605166	153201	2451965	4091167	335800	3755368
6	ParasPetro	Surat	103694	93206	10488	0	0	0	103694	93206	10488
7	GJ Apar	Baruch	200804	195336	5468	0	0	0	200804	195336	5468

**Number of Agricultural consumers connected on selected feeders DTs and LT-HT ratio**

Feeder Name	Number of Transformer with one Ag consumer	Number of Transformer with two Ag consumers	Number of Transformer with more than two Ag consumers	Total HT Length	Total LT length	LT/HT ratio
<b>Urban</b>						
Navyug	-	-	-	10	24.6	2.5
<b>Rural</b>						
Palej	19	9	28	34	62	1.8
Rabda	1	3	23	24	74	3.1
<b>Industrial</b>						
Feeder No. 11	-	-	-	22	38	1.7
Amroll	2	0	1	7	3	0.5

**Capacity wise number of transformers on selected feeders**

Capacity/Feeders kVA	Navyug	Amroll	Feeder No. II	Rabda	Palej
25	2	-	-	8	12
50	0	-	7	1	0
63	16	11	16	18	28
75	-	-	-	-	-
100	13	19	32	4	4
200	-	5	17	-	-
250	-	-	1	-	-
300	-	-	1	-	1
400	-	-	2	-	-
500	2	-	2	-	-
Total	33	35	78	31	45

Agricultural consumption for the study period and projection for year 2000-01 (identified feeders)

Sr. No	Feeder	Circle	During study period				During 2000-01			
			Actual Agricultural Load, HP (MRI)	Energy sent out , KWh	Assessed agricultural consumption	Agricultural consumption/HP (Actual)	Energy sent out , KWh	Assessed agricultural consumption	Agricultural consumption/HP (Actual)	
Rural										
1	Rabda	Valsad	674	1940400	1131962	1679	4614526	2691954	3993	
2	Palej	Baruch	1855	5026427	3240275	1747	10954239	7061626	3808	

List of meters on various feeders where operating load was found more than the sanctioned load

Feeder	Meter No	Connected load	Operating Load	Difference	% Difference
South Zone					
<b>Rabda</b>					
1	1960525	74	82	7	10%
2	1960527	35	37	2	5%
3	21138	25	43	18	72%
4	1960620	18	80	62	345%
<b>Palej</b>					
1	1960494	13	15	2	12%
2	1960599	7	11	4	47%
3	1960475	13	28	15	113%
4	1960471	11	12	1	7%
5	1960457	8	14	6	81%
6	1960601	8	9	1	13%
7	1960459	65	89	24	36%
8	1960574	52	57	5	9%
9	1960455	22	30	8	35%
10	1960580	15	16	1	7%
11	1960460	79	87	8	10%
12	1959664	11	13	2	14%
13	1960668	15	23	8	55%
14	1960577	72	104	32	44%
15	1960474	11	12	1	7%
16	1960646	35	73	38	107%
17	1959659	22	30	7	32%
18	1959687	19	33	14	75%
19	1960354	11	28	17	153%

## Summary of Transformers operating on high load

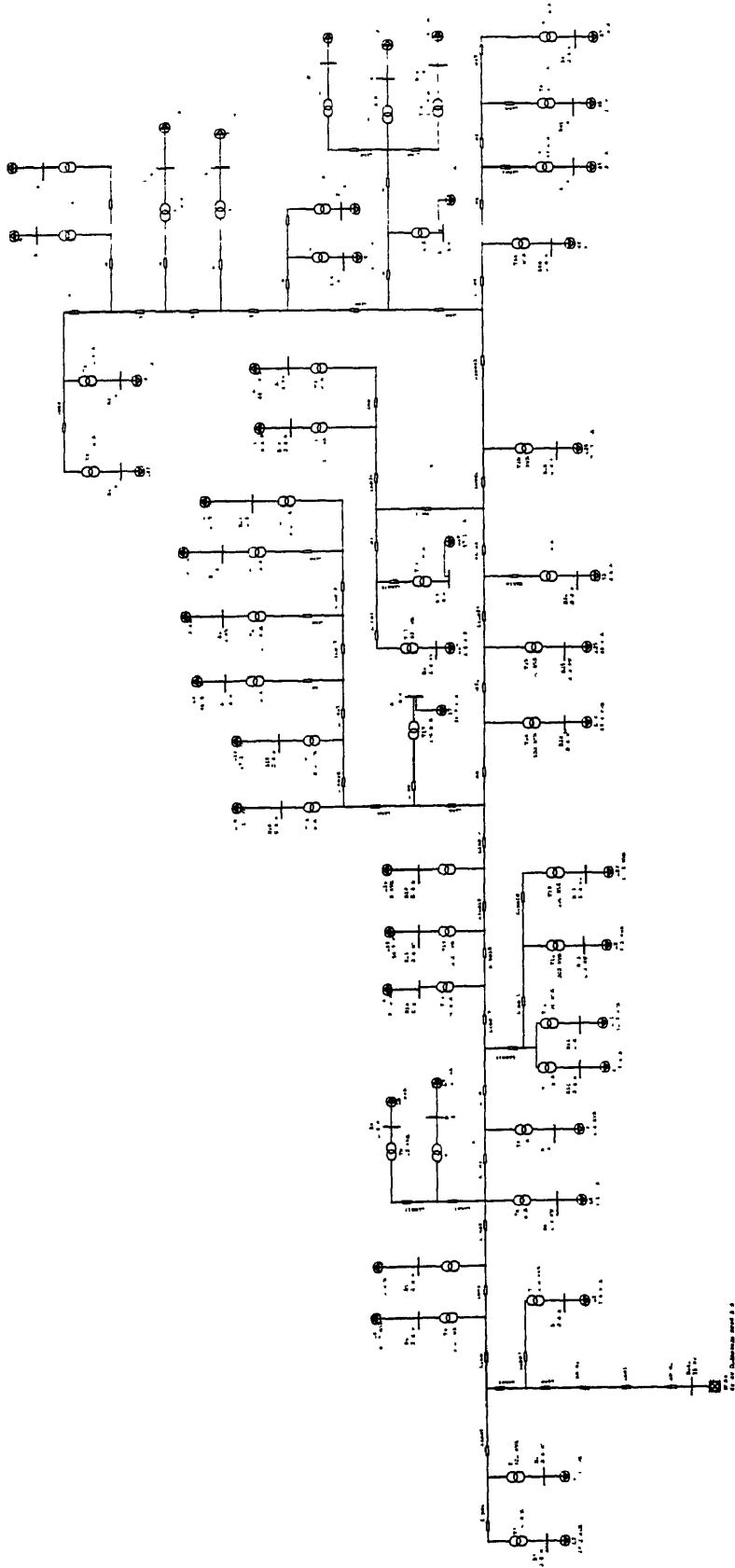
Feeder	Total number of Transformer	Number of Transformer with Higher Percentage Load
	South Zone	
Rabda	30	4
Palej	62	19
		13%
		31%

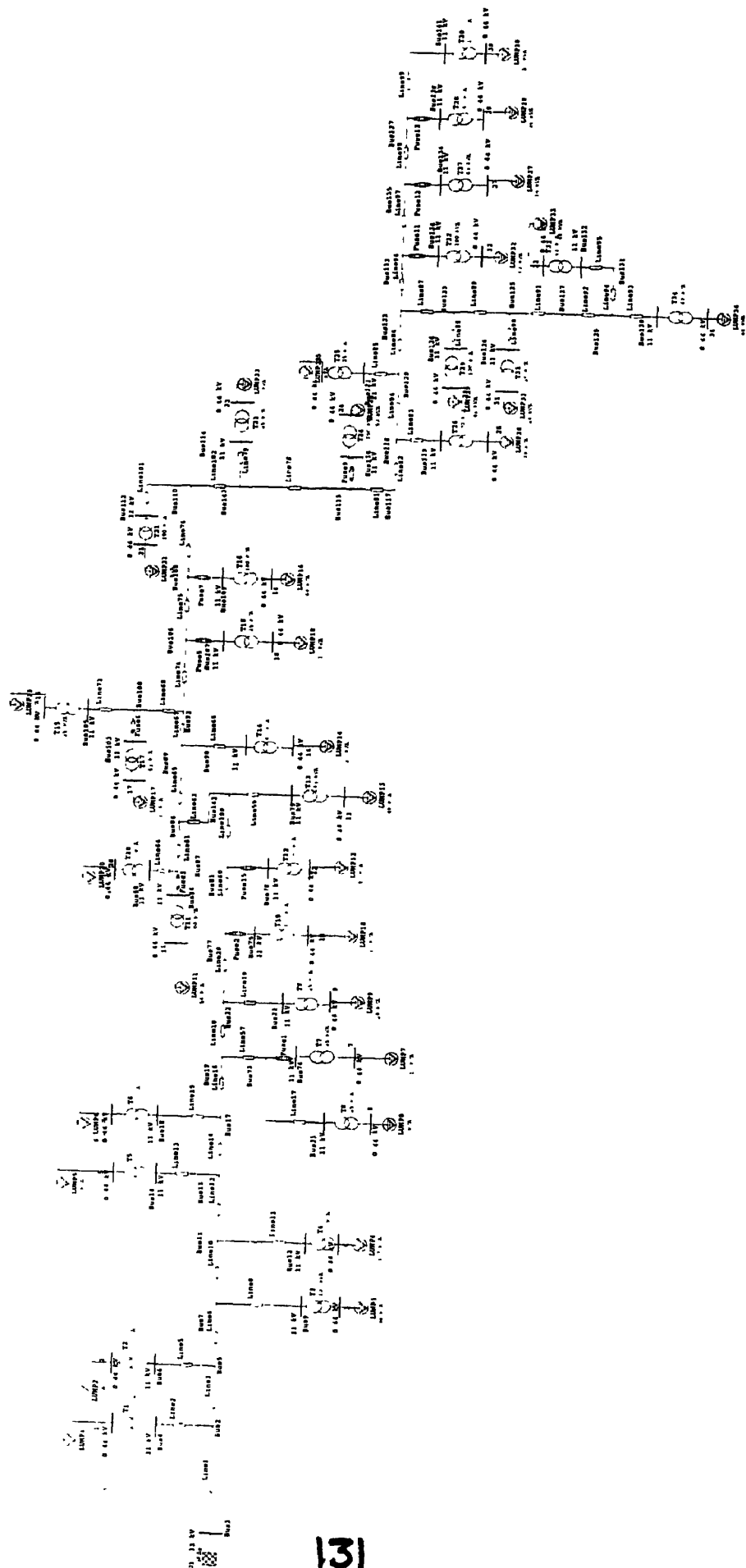
## Category wise consumption for the South Zone during year 2000-01

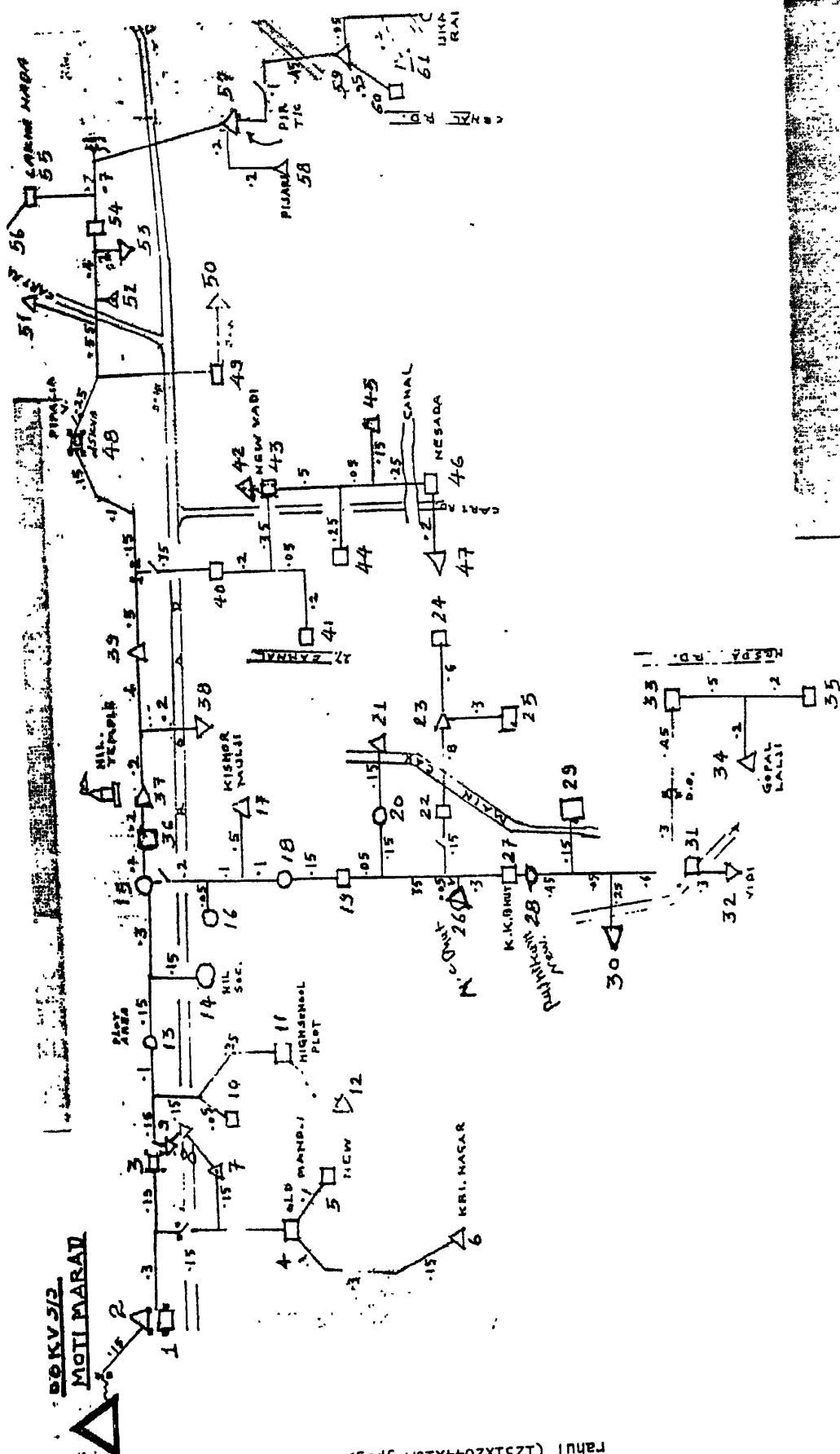
Category	Total Sent out	Total billed energy	Agricultural assessment	Total Consumption	Agricultural Consumption/ HP	Total technical energy loss	Total commercial loss	Total energy loss
	MU	MU	MU	MU		MU	MU	MU
Rural	1469	72	919	991	2409	131	347	478
Urban	977	205		205		133	639	772
Industrial	2981	568		568		141	2272	2413
HTEX	490	167		167		1	322	323
Total	5917	1012	919	1931	2409	406	3580	3986

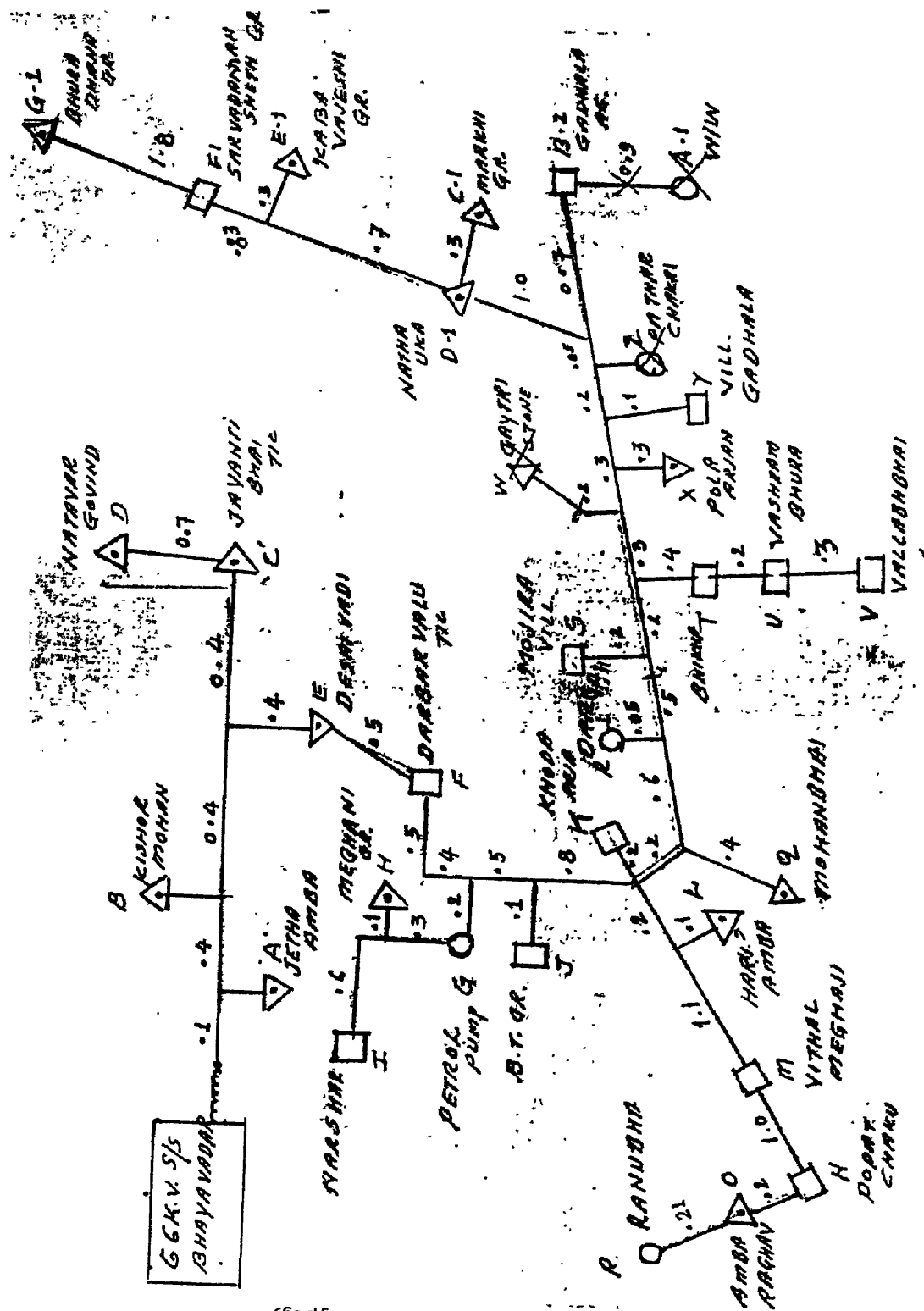






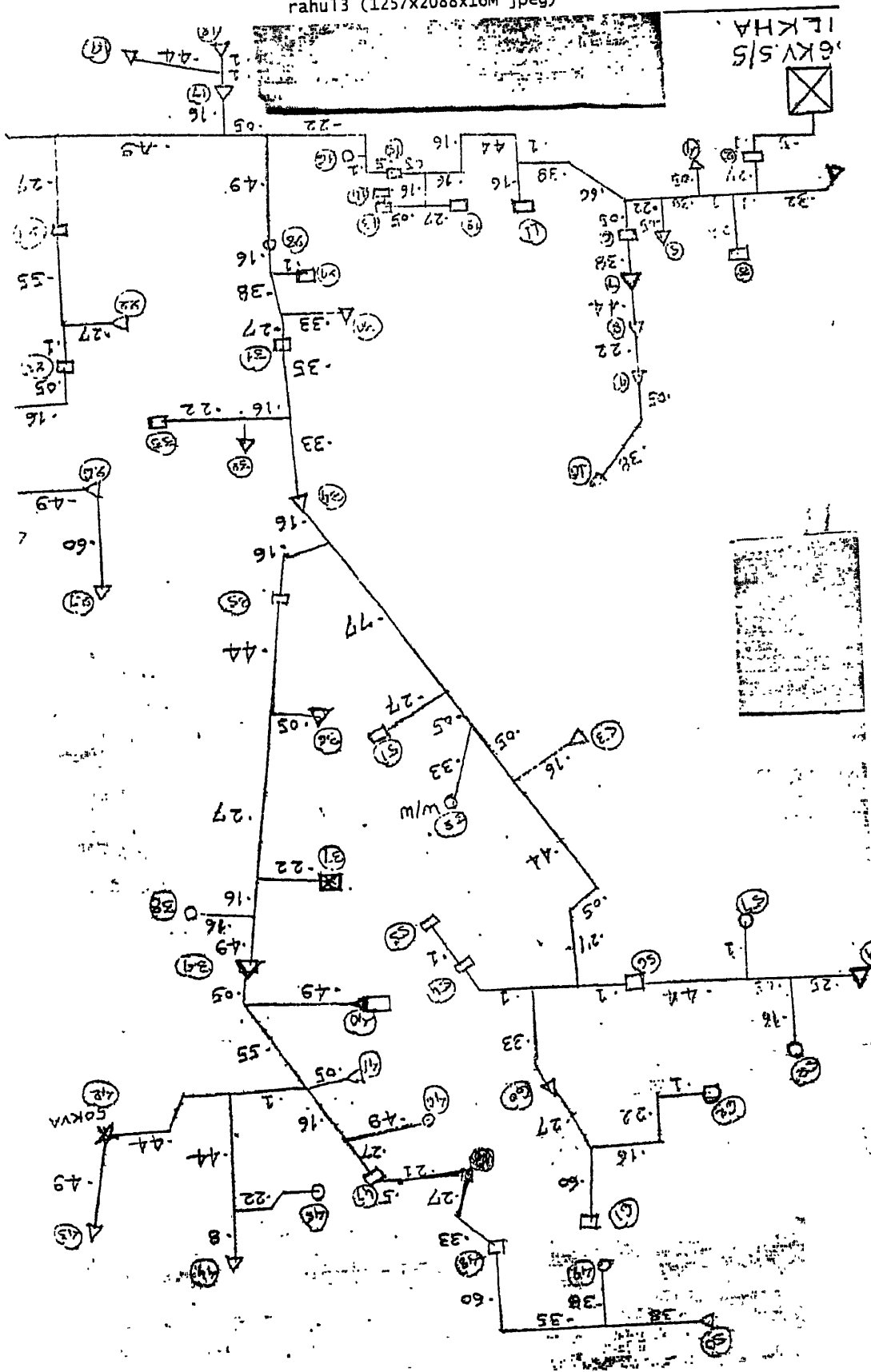


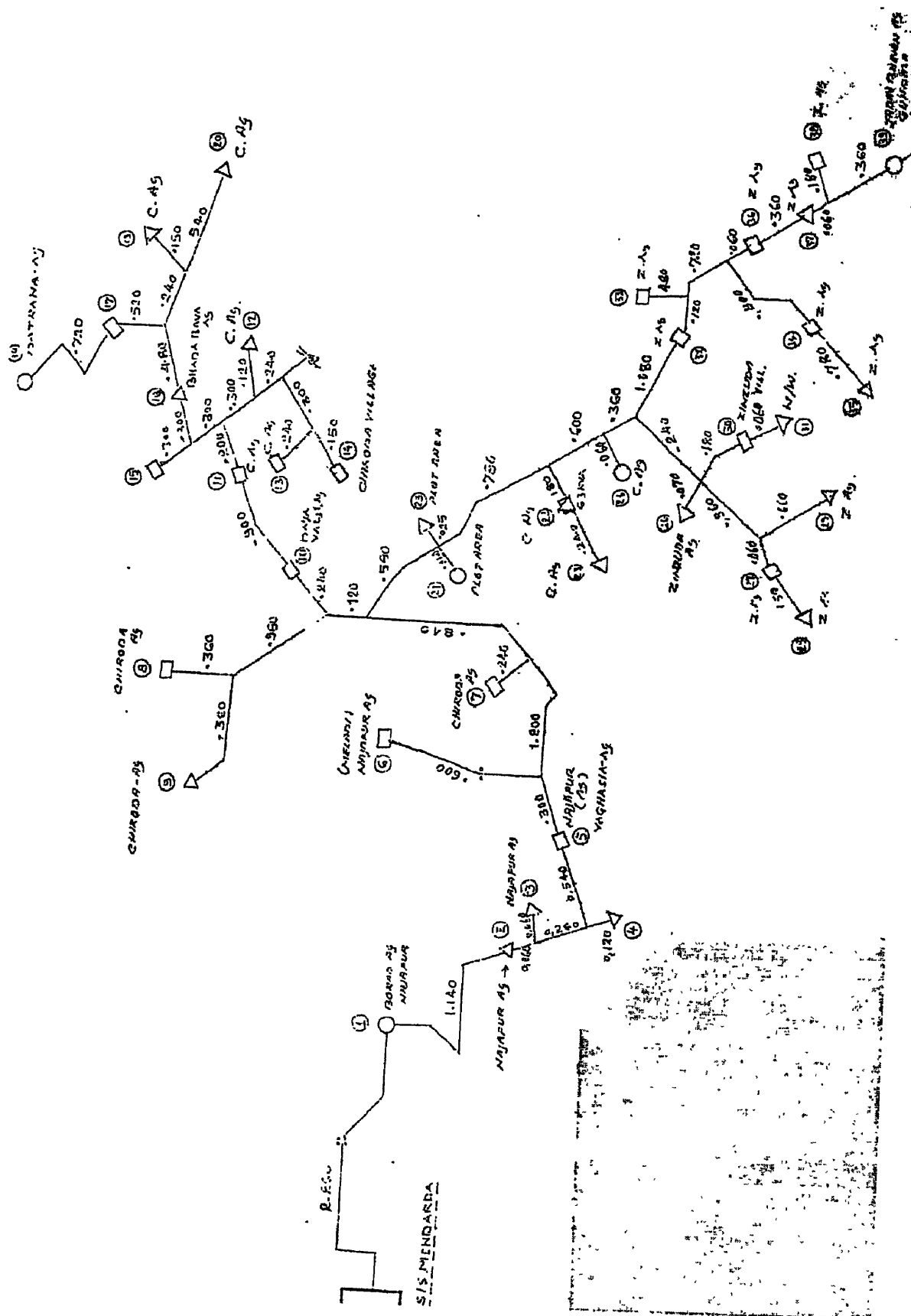


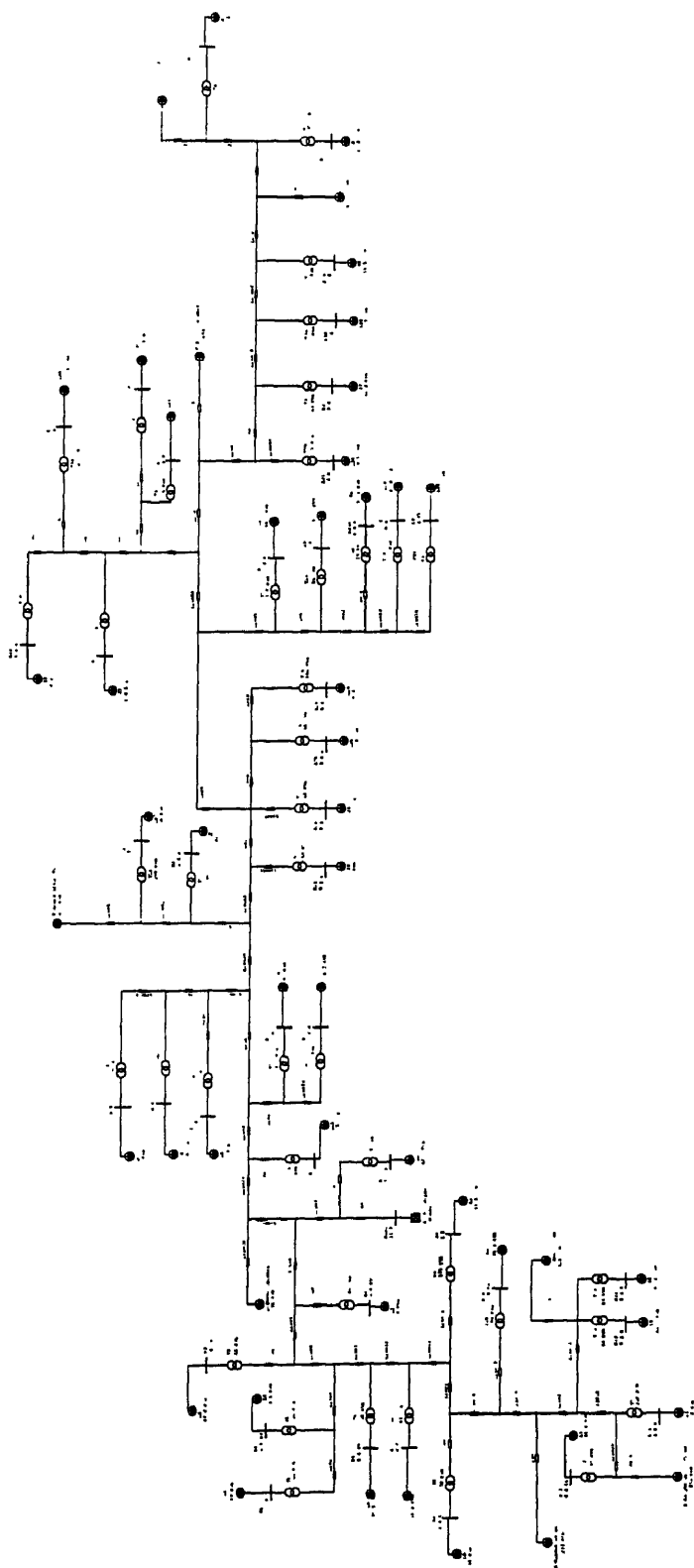


rahu12 (1226x1732x16m j peg)

rahu13 (1257x2088x16M jpeg)









Project	ETAP PowerStation	Page: 1
Location	400C	Date: 07-02-2002
Contract		SN: TATAENERGY
Engineer		Revision: Base
Filename: Bhaktanagar	Study Case: LP	Config: Normal

# Electrical Transient Analyzer Program

## ETAP PowerStation

### Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

	<u>System</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>			
Number of Buses	1	0	113	114			

	<u>XPMR2</u>	<u>XPMR3</u>	<u>Resistor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	45	0	0	68	0	0	113

Method of Solution: Newton-Raphson Method  
Maximum No. of Iterations: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Bhaktanagar

Output Filename: C:\GEB\_temporary\New Folder (14)\Bhaktanagar\Unstudied I

## SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF	
Swing Bus(es)		3.317	1.802	3.775	87.87 Lagging
Generators		0.000	0.000	0.000	100.00 Lagging
Total Demand		3.317	1.802	3.775	87.87 Lagging
Total Motor Load		3.145	1.523	3.495	90.00 Lagging
Total Static Load		0.000	0.000		
Apparent Losses		0.172	0.279		
System Mismatch		0.000	0.000		

Number of Iterations: 1

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 02-07-2002
Contract:		SN: TATAENERGY
Engineer:		Revision: Base
Filename: Mahila College	Study Case: LF	Config.: Normal

### Electrical Transient Analyzer Program

ETAP PowerStation

### Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

Number of Buses:	Swing 1	Generator 0	Load 120	Total 121			
Number of Branches:	XFMR2 45	XFMR3 0	Reactor 0	Line/Cable 64	Impedance 0	Tie PD 0	Total 190

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Mahila College

Output Filename: C:\GEB\_temporary\New Folder (14)\Mahila college\Untitled.lfl

### SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF	
Swing Bus(es):	2.276	1.261	2.602	87.46	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand:	2.276	1.261	2.602	87.46	Lagging
Total Motor Load:	2.082	1.008	2.313	90.00	Lagging
Total Static Load:	0.000	0.000			
Apparent Losses:	0.194	0.253			
System Mismatch:	0.000	0.000			

Number of Iterations: 3

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 02-07-2002
Contract:		SN: TATAENERGY
Engineer:	Study Case: LF	Revision: Base
Filename: Motimarad		Config: Normal

**Electrical Transient Analyzer Program**  
**ETAP PowerStation**

**Load Flow Analysis**  
Loading Category: Design  
Load Diversity Factor: None

Number of Buses:	Swing 1	Generator 0	Load 168	Total 169			
Number of Branches:	XFMR2 62	XFMR3 0	Reactor 0	Line/Cable 88	Impedance 0	Tie PD 0	Total 190

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99  
Precision of Solution: 0.000100

System Frequency: 50.00  
Unit System: Metric  
Project Filename: Motimarad  
Output Filename: C:\GEB\_temporary\New Folder (14)\Motimarad\Untitled1.fl

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es)	1.097	0.607	1.254	87.46	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand	1.097	0.607	1.254	87.46	Lagging
Total Motor Lo	0.982	0.475	1.091	90.00	Lagging
Total Static Lo	0.000	0.000			
Apparent Loss	0.115	0.153			
System Mismatch	0.000	0.000			
Number of Iterations: 3					

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 02-07-2002
Contract:		SN: TATAENERGY
Engineer:		Revision: Base
Filename: Gadhala	Study Case: LF	Config: Normal

### Electrical Transient Analyzer Program

ETAP PowerStation

### Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

Number of Buses:	Swing 1	Generator 0	Load 81	Total 82			
Number of Branches:	XFMR2 30	XFMR3 0	Reactor 0	Line/Cable 44	Impedance 0	Tie PD 0	Total 190

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Gadhala

Output Filename: C:\GEB\_temporary\New Folder (14)\Gadhala\Untitled1.fl

### SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF	
Swing Bus(es)	0.794	0.440	0.908	87.46	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand	0.794	0.440	0.908	87.46	Lagging
Total Motor Lo	0.734	0.354	0.815	90.00	Lagging
Total Static Lo	0.000	0.000			
Apparent Loss	0.060	0.086			
System Mismatch	0.000	0.000			

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 03-07-2002
Contract:		SN: TATAENERGY
Engineer:	Study Case: LF	Revision: Base
Filename: Bagdu		Config.: Normal

# **Electrical Transient Analyzer Program**

**ETAP PowerStation**

## **Load Flow Analysis**

Loading Category: Design

Load Diversity Factor: None

Number of Buses:	Swing 1	Generator 0	Load 164	Total 165			
Number of Branches:	XFMR2 62	XFMR3 0	Reactor 0	Line/Cable 90	Impedance 0	Tie PD 0	Total 109

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Bagdu

Output Filename: C:\Bagdu\Untitled.lfi

## **SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(e	3.063	2.095	3.711	82.53	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Deman	3.063	2.095	3.711	82.53	Lagging
Total Motor	2.852	1.766	3.355	85.00	Lagging
Total Static L	0.000	0.000			
Apparent Los	0.211	0.329			
System Mism	0.000	0.000			

Number of Iterations: 3

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 02-07-2002
Contract:		SN: TATAENERGY
Engineer:	Study Case: LF	Revision: Base
Filename: Chiroda		Config.: Normal

**Electrical Transient Analyzer Program**  
**ETAP PowerStation**

**Load Flow Analysis**  
Loading Category: Design  
Load Diversity Factor: None

Number of Buses:	Swing 1	Generator 0	Load 134	Total 135			
Number of Branches:	XFMR2 44	XFMR3 0	Reactor 0	Line/Cable 92	Impedance 0	Tie PD 0	Total 190

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99  
Precision of Solution: 0.000100

System Frequency: 50.00  
Unit System: Metric  
Project Filename: Chiroda  
Output Filename: C:\GEB\_temporary\New Folder (14)\Chiroda\Untitled.lfl

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es)	2.984	1.654	3.412	87.46	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand	2.984	1.654	3.412	87.46	Lagging
Total Motor Lo	2.726	1.318	3.028	90.00	Lagging
Total Static Lo	0.000	0.000			
Apparent Loss	0.258	0.336			
System Misma	0.000	0.000			

Number of Iterations: 3

Project:	ETAP PowerStation	Page: 1
Location:	4.0.0C	Date: 02-07-2002
Contract:		SN: TATAENERGY
Engineer:	Study Case: LF	Revision: Base
Filename: Vijarkhi		Config.: Normal

**Electrical Transient Analyzer Program**  
**ETAP PowerStation**

**Load Flow Analysis**

Loading Category: Design

Load Diversity Factor: None

Number of Buses:	Swing 1	Generator 0	Load 128	Total 129			
Number of Branches:	XFMR2 56	XFMR3 0	Reactor 0	Line/Cable 78	Impedance 0	Tie PD 0	Total 190

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Vijarkhi

Output Filename: C:\GEB\_temporary\New Folder (14)\Vijarkhi\Untitled1.fl

**SUMMARY OF TOTAL GENERATION, LOADING & DEMAND**

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>	
Swing Bus(es)	2.048	1.136	2.342	87.46	Lagging
Generators:	0.000	0.000	0.000	100.00	Lagging
Total Demand	2.048	1.136	2.342	87.46	Lagging
Total Motor L	1.833	0.887	2.036	90.00	Lagging
Total Static Lo	0.000	0.000			
Apparent Loss	0.215	0.249			
System Mismatch	0.000	0.000			

Number of Iterations: 3

Project: ETAP PowerStation  
 Location: 400C  
 Contract:  
 Engineer:  
 Study Case: LP  
 Filename: Jambudiya

Electrical Transient Analyzer Program

ETAP PowerStation

Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

	Swing	Generator	Load	Total	
Number of Buses	1	0	117	118	
	XFMR1	XFMR2	Reactor	Line/Cable	Impedance
Number of Branches	42	0	0	75	0

Method of Solution: Newton-Raphson Method  
 Maximum No. of Iteration: 99  
 Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Jambudiya

Output Filename: C:\QZEB\_temporary\New Folder (14)\Jambudiya\Untitled1.d

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	Mvar	MVA	% PF
Swing Buses:	3149	2024	3764	84.13 Lagging
Generators:	0.000	0.000	0.000	100.00 Lagging
Total Demand	3149	2024	3764	84.13 Lagging
Total Motor Load	3070	1902	3611	85.00 Lagging
Total Static Load	0.000	0.000		
Apparent Losses	0.080	0.121		
System Mismatch		0.000	0.000	
Number of Iterations:	3			





Energy sent and consumption for the identified feeders during the study period (sample case)

Sr. No	Feeder	Circle	Energy Sent out (kWh)	Transformer Consumption (kWh)	Billed Energy (kWh)	Agricultural Consumption (kWh)	Total Consumption (kWh)
<b>Urban</b>							
1	Bhaktinagar	Rajkot	9272673	8762460	6337138	0	6337138
2	Mahila College	Rajkot	9572556	7855511	5560895	0	5560895
<b>Rural</b>							
3	Zikiyari	Rajkot	3678310	3372673	17579	2659864	2677442
4	Motimarad	Rajkot	4394526	1907081	776882	1027323	1804204
5	Gadhala	Rajkot	882800	652071	47124	586995	634119
6	Bagdu	Junagarh	6598534	5527714	526037	4488032	5014069
7	Chiroda	Junagarh	6719417	5452816	296391	5022350	5318741
8	Vijarkhi	Jamnagar	3704000	2925446	377612	1825323	2202935
<b>Industrial</b>							
9	Jambudiya	Rajkot	7944800	7805003	6370535	0	6370535

Feeder wise Energy losses (Total, HT and LT) during the Study period (Sample case)

Feeder wise Energy losses (Total, HT and LT) during the Study period (Sample case)											
Sr. No	Feeder	Circle	HT Losses kWh			LT Losses kWh			Total Energy Losses kWh		
			Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss
Urban											
1	Bhaktinagar	Rajkot	510213	281480	228733	2425322	40836	2384486	2935535	322316	2613219
2	Mahila College	Rajkot	1717045	612116	1104929	2294616	177130	2117485	4011661	789246.8	3222415
Rural											
3	Zikiyari	Rajkot	305637	190332	115306	695231	35160	660071	1000868	225491	775376
4	Motimarad	Rajkot	2487444	127746	2359698	102877	16028.69	86848	2590321	143774.6	2446547
5	Gadhala	Rajkot	230729	24406	206323	17952	8065	9887	248681	32471	216210
6	Bagdu	Junagarh	1070820	170853	899967	513645	47470.08	466175	1584465	218323.4	1366141
7	Chiroda	Junagarh	1266602	372836	893766	134075	99456.97	34618	1400676	472292.8	928383
8	Vijarkhi	Jamnagar	778554	223744	554809	722511	56248	666263	1501065	279993	1221073
Industrial											
9	Jambudiya	Rajkot	139798	89524.2	50274	1434467	9741.396	1424726	1574265	99265.62	1475000

Number of Agricultural consumers connected on selected feeders DTs and LT-HT ratio

Feeder Name	Number of Transformer with one Ag consumer	Number of Transformer with two Ag consumers	Number of Transformer with more than two Ag consumers	Total HT length KM	Total LT length KM	LT/HT ratio
<u>Urban</u>						
Bhaktinagar						
Mahila College				9.0	8.9	1.0
				16.32	23.2	1.4
<u>Rural</u>						
Zikiyani	9	7	13			
Molimarad	5	2	45	22.29	7.5	0.3
Gadhala		1	29	23.13	59.7	2.6
Bagdu	6	3	47	20.7	53.0	2.6
Chiroda	1	2	36	28.4	78.2	2.8
Vijarkhi	2	1	50	24.8	55.4	2.2
<u>Industrial</u>						
Jambudiya				49.4	67.5	1.4
				14.0	6.2	0.4

Capacity wise number of transformers on selected feeders

Capacity/Feeders kVA	Bhaktinagar	Mahila College	Jambudiya	Zikiyari	Motimmarad	Gadhala	Bagdu	Chiroda	Vjarkhi
25	3	1	5	8	9	3	10	5	6
50			1			1	1		1
63	4	5	12	11	28	13	28	21	22
75									
100	15	24	23	13	25	13	23	18	27
200	25	15	1						
250									
300	1								
400									
500	1								
<b>Total</b>	<b>49</b>	<b>45</b>	<b>42</b>	<b>32</b>	<b>62</b>	<b>30</b>	<b>62</b>	<b>44</b>	<b>56</b>

**Agricultural consumption for the study period and projection for year 2000-01 (identified feeders)**

				During study period				During 2000-01	
Sr. No	Feeder	Circle	Actual Agricultural Load, HP( MRI)	Energy sent out , kWh	Assessed agricultural consumption	Agricultural consumption/HP ( Actual)	Energy sent out , kWh	Assessed agricultural consumption	Agricultural consumption/HP ( Actual)
Rural									
1	Zikiyari	Rajkot	1417	3678310	2659864	1877	4661656	3370942	2379
2	Motimmarad	Rajkot	905	4394526	1027323	1135	4911188	1148105	1269
3	Gadhala	Rajkot	920	882800	586995	638	3315000	2204224	2397
4	Bagdu	Junagarh	3326	6598534	4488032	1349	7987490	5432739	1633
5	Chiroda	Junagarh	3424	6719417	5022350	1467	7244960	5415161	1582
6	Vijarkhi	Jamnagar	1511	3704000	1825323	1208	8133600	4008219	2652

List of meters on various feeders where operating load was found more than the sanctioned load

Feeder	Meter No	Connected Load	Operating Load	Difference	% Difference
<b>Rural</b>					
Bagdu					
1	1960982	53.712	133	79.288	148%
2	1960957	66.394	129	62.606	94%
3	1960981	41.776	93.78	52.004	124%
4	1960779	66.021	116	49.979	76%
5	1960756	58.934	105.2	46.266	79%
6	1960775	29.467	70	40.533	138%
7	1960796	60.799	98.78	37.981	62%
8	1960751	35.435	69.5	34.065	96%
9	1960868	58.188	91.3	33.112	57%
10	1960785	60.053	87	26.947	45%
11	1960984	11.936	37.83	25.894	217%
12	1960986	26.11	51.2	25.09	96%
13	1960963	95.488	120.4	24.912	26%
14	1960788	81.314	104	22.686	28%
15	1960985	42.895	64.47	21.575	50%
16	1960789	54.831	75.86	21.029	38%
17	1960791	19.396	40.41	21.014	108%
18	1959846	31.705	51.83	20.125	63%
19	1959811	11.19	27	15.81	141%
20	1959840	64.902	79.4	14.498	22%
21	1960749	19.396	31.66	12.264	63%
22	1960962	41.776	53.83	12.054	29%
23	1960964	22.38	32.22	9.84	44%
24	1960958	48.117	55.75	7.633	16%
25	1959837	11.936	19.09	7.154	60%

Feeder	Meter No	Connected Load	Operating Load	Difference	% Difference
26	1960787	50.355	56.29	5.935	12%
27	1960754	24.245	29.93	5.685	23%
28	1960773	47.371	52.89	5.519	12%
29	1960877	45.133	50.6	5.467	12%
Chiroda					
1	1961011	26.11	145.3	119.19	456%
2	1960959	54.83	143.5	88.67	162%
3	1960906	38.05	119.2	81.15	213%
4	1960690	52.97	125.37	72.40	137%
5	1960782	31.71	102.2	70.50	222%
6	1960778	17.90	86.76	68.86	385%
7	1960781	22.38	85.8	63.42	283%
8	1960864	55.95	111.23	55.28	99%
9	1960992	29.84	84.35	54.51	183%
10	1960867	11.19	60	48.81	436%
11	1961007	39.91	88.2	48.29	121%
12	1960865	31.33	78.82	47.49	152%
13	1959834	26.11	70.23	44.12	169%
14	1960689	51.85	91.96	40.11	77%
15	1959843	31.33	68	36.67	117%
16	1960954	86.54	120	33.46	39%
17	1960711	52.22	85.6	33.38	64%
18	1960862	74.60	100	25.40	34%
19	1960678	52.22	76.3	24.08	46%
20	1960996	55.95	77.6	21.65	39%
21	1960713	38.79	60.3	21.51	55%
22	1959810	11.19	31.2	20.01	179%
23	1961005	60.80	75.6	14.80	24%
24	1961006	39.54	53	13.46	34%
25	1959812	37.30	44.9	7.60	20%

Feeder	Meter No	Connected Load	Operating Load	Difference	% Difference
26	1961010	49.24	55.9	6.66	14%
27	1960885	28.35	34.5	6.15	22%
28	1959833	33.57	37.64	4.07	12%
29	1961008	17.53	21.3	3.77	21%
30	1959842	10.07	12.84	2.77	27%
Vijarkhi					
1	1960842	24.89	101.87	76.98	309%
2	1959794	55.95	94.23	38.28	68%
3	1961031	67.14	102.5	35.36	53%
4	1961014	22.38	52	29.62	132%
5	1960693	51.10	77.48	26.38	52%
6	1960965	23.13	46.7	23.57	102%
7	1960972	33.57	52.5	18.93	56%
8	1961015	58.19	74.38	16.19	28%
9	1960745	28.35	43.56	15.21	54%
10	1960695	44.39	51.24	6.85	15%
11	1960838	37.30	43.26	5.96	16%
12	195827	11.19	12.28	1.09	10%
Gadhala					
1	1960885	42.90	73.88	30.99	72%
2	1959817	50.36	73.46	23.11	46%
Motimarad					
1	1960940	23.87	49.66	25.79	108%
2	1959798	11.19	26.38	15.19	136%
3	1960832	44.01	56.4	12.39	28%
4	1960830	53.71	62.5	8.79	16%
5	1959806	11.19	18.77	7.58	68%
6	23091	18.28	19.15	0.87	5%
Zikiyari					
1	23502	58.54	106.31	47.77	82%



Feeder	Meter No	Connected Load	Operating Load	Difference	% Difference
2	1960173	29.74	74.60	44.86	151%
3	1960175	18.14	44.76	26.62	147%
4	23505	26.83	48.49	21.66	81%
5	1959700	17	37.30	20.30	119%
6	1961051	38.87	50.36	11.49	30%
7	1961052	50	55.95	5.95	12%
8	1959704	59.6	64.16	4.56	8%
9	1960046	10.5	14.92	4.42	42%
10	1959686	10.96	14.92	3.96	36%
11	1960172	41.85	44.76	2.91	7%
12	1960027	36.38	37.30	0.92	3%
13	1959524	15.71	16.41	0.70	4%
14	1960030	14.7	14.92	0.22	1%

#### Summary of Transformers operating on high load

Feeder	Total number of Transformer	Number of Transformer with Higher Load	Percentage
Rural			
Bagdu	62	38	61%
Chiroda	44	33	75%
Motimmarad	62	6	10%
Gadhala	30	2	7%
Vjarkhi	56	15	27%
Zikiyari	32	14	44%

Category wise consumption for the West Zone 1 during year 2000-01

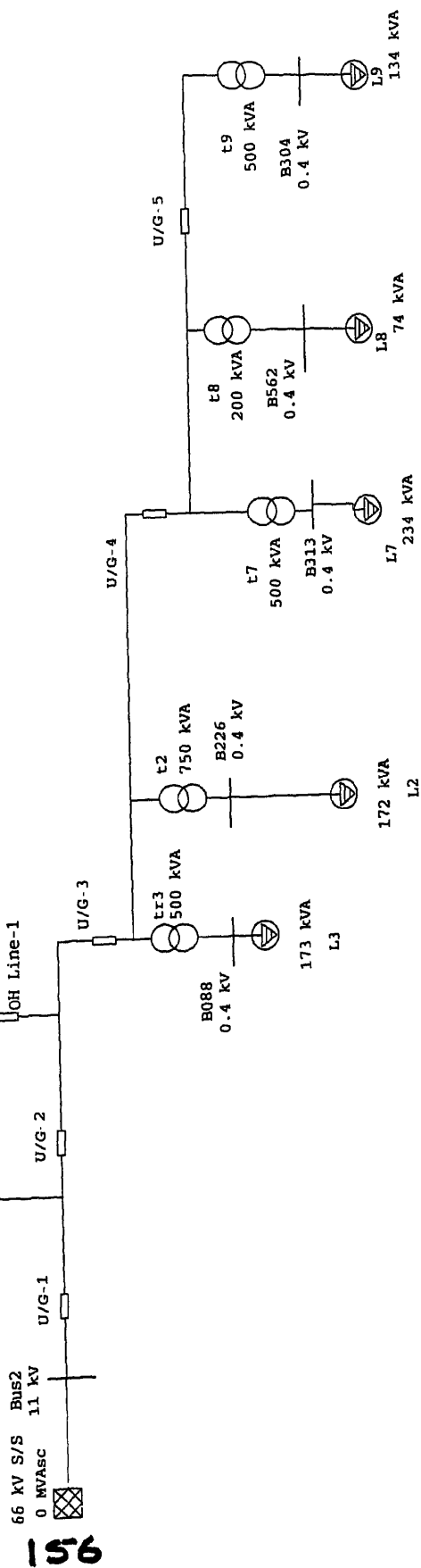
Category	Total Sent out	Total billed energy	Agricultural assessment	Total Consumption	Agricultural Consumption/ HP	Total technical energy loss	Total commercial loss	Total energy loss
	MU	MU	MU	MU		MU	MU	MU
Rural	3686	116	2465	2675	1662	218	887	1105
Urban	1901	1013		1250		108	780	888
Industrial	645	431		532		8	206	214
HTEX	136	112		138		1	23	24
Total	6368	1672	2465	4137	1662	335	1896	2231



## **Distribution System West Zone 2**

- ⇒ *One Line Diagram of the 11 kV network*
- ⇒ *Load Flow Summary Report*
- ⇒ *Energy Losses and Agricultural Consumption*
- Sample Case*
- ⇒ *Transformers and Agricultural Consumers*
- ⇒ *Sanctioned Demand Analysis*
- ⇒ *Summary for the Zone*

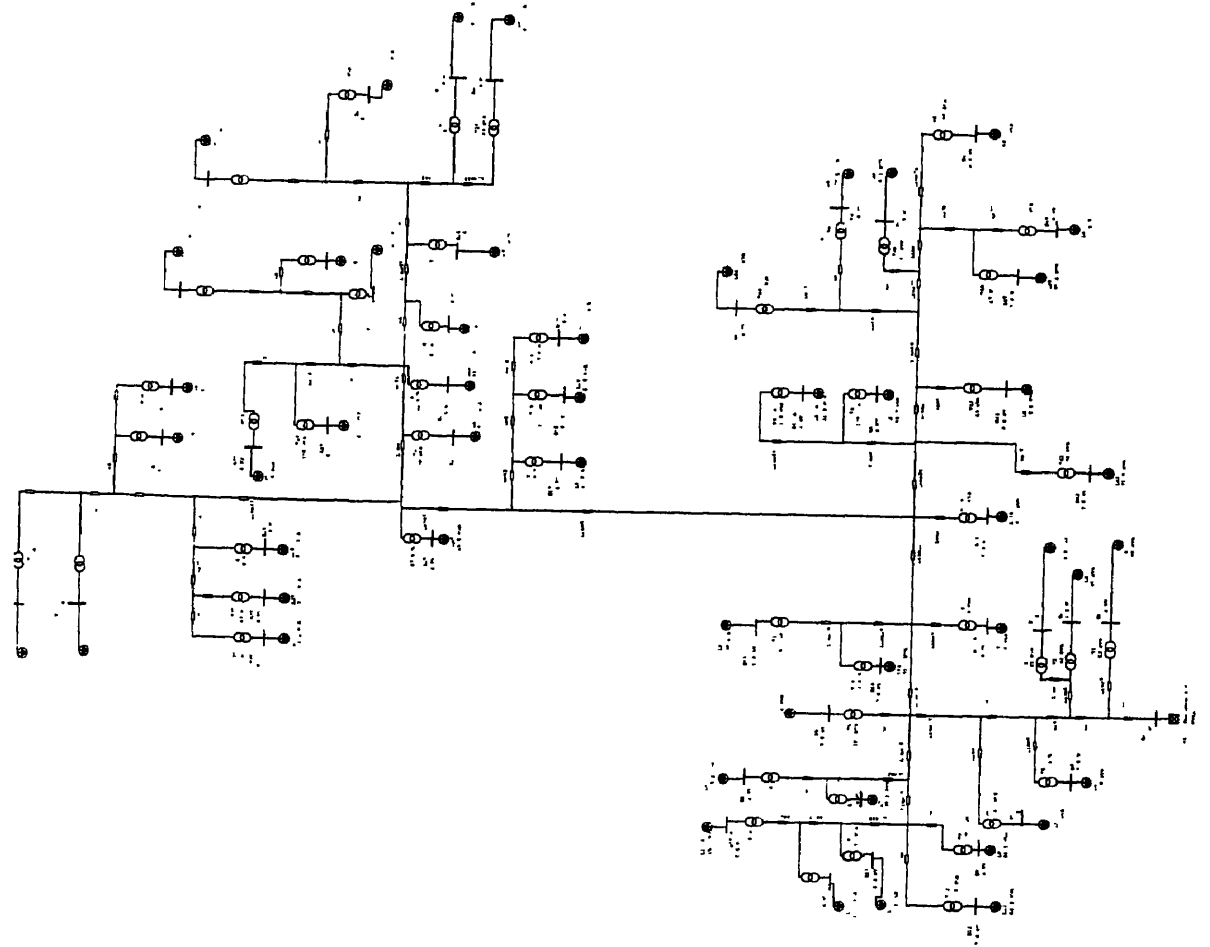


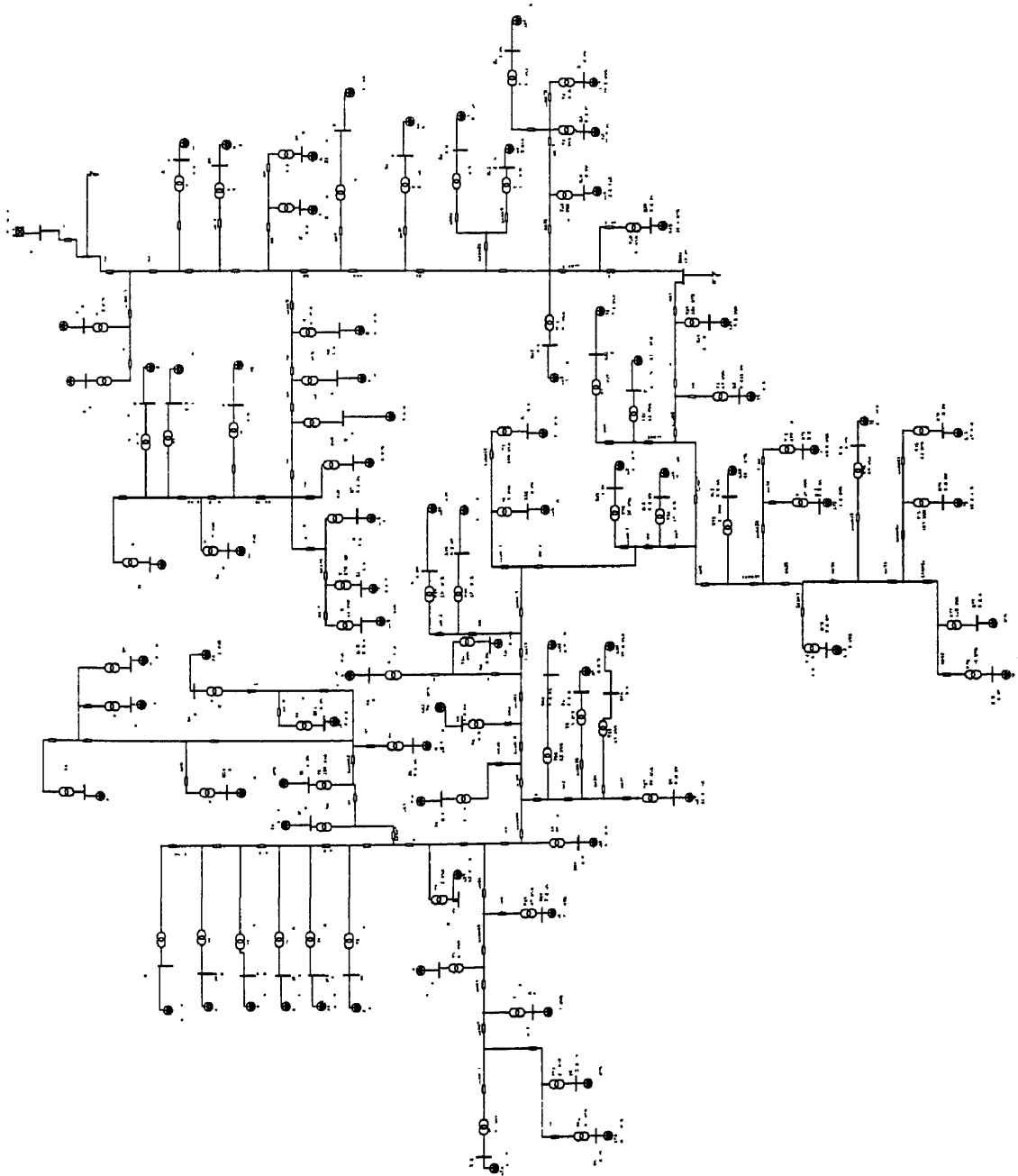


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One-Line Diagram

PALASAN





Project File: Bhandar

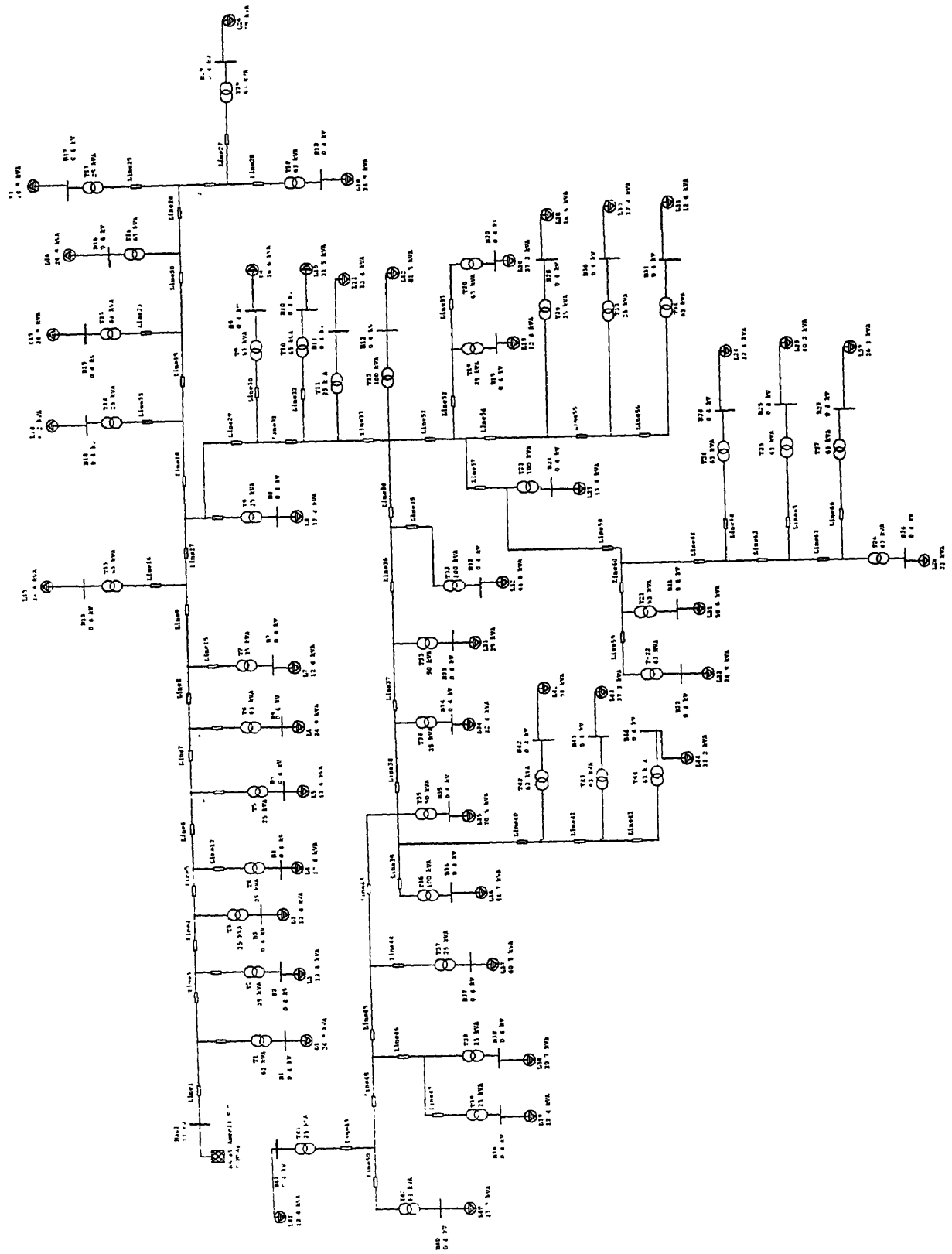
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page 1



# One-Line Diagram - JALIYA



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Project	ETAP PowerStation	Page: 1
Location	400C	Date: 07-02-2002
Contract		SN: TATAENERGY
Engineer		Revision: Basic
Filename: Khargate	Study Case: LF	Config: Normal

Electrical Transient Analyzer Program

ETAP PowerStation

Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>
Number of Buses	1	0	17	18

	<u>XFORM2</u>	<u>XFORM3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	9	0	0	8	0	0	17

Method of Solution: Newton-Raphson Method  
Maximum No. of Iterations: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Khargate

Output Filename: C:\GEB\_temporary\New Folder (14)\Khargate\Khargate LF

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Swing Bus(es)	1.322	0.671	1.482	89.16 Lagging
Generators	0.000	0.000	0.000	100.00 Lagging
Total Demand	1.322	0.671	1.482	89.16 Lagging
Total Motor Load	1.310	0.635	1.456	90.00 Lagging
Total Static Load	0.000	0.000		
Apparent Losses	0.011	0.037		
System Mismatch	0.000	0.000		

Number of Iterations: 2

Project	ETAP PowerStation	Page 1
Location	400C	Date 07-02-2002
Contract Engineer		SN TATAENERGY
	Study Case: LP	Revision: Base
Filename: Palasan		Config: Normal

# Electrical Transient Analyzer Program

## ETAP PowerStation

### Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

	<u>Swing</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>
Number of Buses	1	0	124	125

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	50	0	0	74	0	0	124

Method of Solution: Newton-Raphson Method

Maximum No of Iteration: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Palasan

Output Filename: C:\GEB\_temporary\New Folder (14)\Palasanew\Untitled1.in

## SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Swing Bus(es)	1722	0.885	1936	88.94 Lagging
Generators	0.000	0.000	0.000	100.00 Lagging
Total Demand	1722	0.885	1936	88.94 Lagging
Total Motor Load	1680	0.814	1867	90.00 Lagging
Total Static Load	0.000	0.000		
Apparent Losses	0.041	0.071		
System Mismatch		0.000	0.000	

Number of Iterations: 1

Project:  
Location:  
  
Contract:  
Engineer:  
  
Filename: Bhandar

ETAP PowerStation  
  
400C  
  
  
Study Case: LF

Page: 1  
Date: 02-07-2002  
  
SN: TATAENERGY  
Revision: Base  
  
Config: Normal

Electrical Transient Analyzer Program

ETAP PowerStation

Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

	<u>Switch</u>	<u>Generator</u>	<u>Load</u>	<u>Total</u>
Number of Buses	1	0	190	191

	<u>XFMR1</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>Line/Cable</u>	<u>Impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	78	0	0	112	0	0	190

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99

Precision of Solution: 0.000100

System Frequency: 50.00

Unit System: Metric

Project Filename: Bhandar

Output Filename: C:\JEB\temporary\New Folder (14)\Bhandar\Untitled1.D

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Swing Buses:	3.428	1.901	3.920	87.46 Lagging
Generators	0.000	0.000	0.000	100.00 Lagging
Total Demand	3.428	1.901	3.920	87.46 Lagging
Total Motor Load	3.194	1.547	3.548	90.00 Lagging
Total Static Load	0.000	0.000		
Apparent Load	0.235	0.354		
System Mismatch	0.000	0.000		

Number of Iterations: 3



Project:  
Location:  
  
Contract:  
Engineer:  
  
Filename: Jaliya

ETAP PowerStation  
  
400C  
  
Study Case: LF

Page: 1  
Date: 03-07-2002  
  
SN: TATAENERGY  
Revision: Base  
  
Config: Normal

Electrical Transient Analyzer Program

ETAP PowerStation

Load Flow Analysis

Loading Category: Design

Load Diversity Factor: None

	Swing	Generator	Load	Total			
Number of Buses	1	0	109	110			

	XFMER	XFMER	Resistor	Line/Cable	Impedance	Tie PD	Total
Number of Branches	44	0	0	65	0	0	109

Method of Solution: Newton-Raphson Method  
Maximum No. of Iteration: 99  
  
Precision of Solution: 0.000100

System Frequency: 50.00  
  
Unit System: Metric  
  
Project Filename: Jaliya  
  
Output Filename: C:\Jaliya\Untitled1.f

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	MW	MVar	MVA	% PF
Swing Bus(es)	1.104	0.755	1.337	82.53 Lagging
Generators	0.000	0.000	0.000	100.00 Lagging
Total Demand	1.104	0.755	1.337	82.53 Lagging
Total Motor Load	1.012	0.627	1.191	85.00 Lagging
Total Static Load	0.000	0.000		
Apparent Losses	0.092	0.128		
System Mismatch	0.000	0.000		

Number of Iterations: 3



**Energy sent and consumption for the identified feeders during the study period (sample case)**

Sr. No	Feeder	Circle	Energy Sent out kWh	Transformer Consumption kWh	Billed Energy kWh	Agricultural Consumption kWh	Total Consumption kWh
1	Karget	Bhavnagar	5806532	5732788	3246144	0	3246144
2	Palasan	Sure'nagar	5423246	4147365	7259	3812563	3819822
3	Bhandar	Bhavnagar	9139322	6229786	367128	5116353	5483480
4	Jaliya	Amreli	2277609	1829409	300249	1484622	1784871

**Feeder wise losses (Total, HT and LT) during the Study period (Sample case)**

Sr. No	Feeder	Circle	HT Losses kWh			LT Losses kWh			Total Energy Losses kWh		
			Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss	Total	Tech. Loss	Comm. loss
1	Karget	Bhavnagar	73744	31240	42504	2486644	200297	2286347	2317268	231537	2085731
2	Palasan	Sure'nagar	1275881	59694	1216187	327543	24039	303504	1610683	83733	1526950
3	Bhandar	Bhavnagar	2909536	398886	2510650	746305	384178	362127	3655842	783064	2872778
4	Jaliya	Amreli	448200	94495	353705	44538	36637	7901	492738	131132	361606



**Number of Agricultural consumers connected on selected feeders DTs and L-T-HT ratio**

Feeder Name	Number of Transformer with one Ag consumer	Number of Transformer with two Ag consumers	Number of Transformer with more than two Ag consumers	Total HT Length	Total LT length	LT/HT ratio
Urban						
Karget	-	-	-	3.6	12.72	3.5
Rural						
Palasan	21	19	10	14.13	7.6	0.5
Bhandar	3	4	63	34.12	89.4	2.6
Jaliya	11	6	17	46.13	32	0.7

**Capacity wise number of transformers on selected feeders**

Capacity/Feeders kVA	Karget	Palasan	Bhandar	Jaliya
25		3	7	18
50			1	3
63	1	24	26	18
100		25	44	7
200	2			
500	6			
<b>Total</b>	<b>9</b>	<b>52</b>	<b>78</b>	<b>46</b>

Agricultural consumption for the study period and projection for year 2000-01 (identified feeders)

Sr. No	Feeder	Circle	Actual Agricultural Load, HP (MRI)	During study period				During 2000-01		
				Energy sent out , KWh	Assessed agricultural consumption	Agricultural consumption/HP (Actual)	Energy sent out , KWh	Assessed agricultural consumption	Agricultural consumption/HP (Actual)	
Rural										
1	Palasan	Sure'nagar	2380	5423246	3812563	1602	6137400	4314616	1813	
2	Bhandar	Bhavnagar	3785.5	9139322	5116353	1352	16273250	9110051	2407	
3	Jaliya	Amreli	1094	2277609	1484622	1357	2107450	1373707	1256	

Category wise consumption for the West Zone2 during year 2000-01

Category	Total Sent out	Total billed energy	Agricultural assessment	Total Consumption	Agricultural Consumption/ HP	Total technical energy loss	Total commercial loss	Total energy loss
	MU	MU	MU	MU		MU	MU	MU
Rural	3128	333	1881	2214	1859	90	824	914
Urban	1003	879		879		32	92	124
Industrial	194	144		144		2	48	50
HTEX	59	52		52		0.1	6.9	7
Total	4384	1408	1881	3289	1859	124	971	1095



## **Summary for the State**

- ⇒ *Energy Sent, Consumed and Agricultural Consumption*
- ⇒ *Energy Losses in the State*
- ⇒ *Sanctioned Demand Analysis*
- ⇒ *Comparison of 11 kV losses (Total, Technical and Commercial) of Zones*
- ⇒ *Comparison of losses (Total) in Rural Category*
- ⇒ *Comparison of losses (Total) in Urban Category*
- ⇒ *Comparison of losses (Total) in Industrial Category*
- ⇒ *Comparison of losses (Commercial) in Rural Category*
- ⇒ *Comparison of losses (Commercial) in Urban Category*
- ⇒ *Comparison of losses (Commercial) in Industrial Category*
- ⇒ *Comparison of Agricultural Consumption in Zones*
- ⇒ *Energy Sent out in Various Zones*



**Summary of Transformers operating on high load**

<b>Feeder</b>	<b>Total number of Transformer</b>	<b>Transformer where loads are higher than sanctioned</b>	<b>Percentage</b>
<b>North</b>			
Piludara	65	8	12%
Laxmipura	52	8	15%
Madhi	21	10	48%
B'Pura	22	10	45%
Katpur	46	24	52%
Mahepura	57	7	12%
Pali	27	11	41%
Matu	46	5	11%
Majadar	36	1	3%
Lukhasan	34	13	38%
Rohika	58	23	40%
<b>Central</b>			
Nadisar	68	10	15%
Gothaj	50	19	38%
Bhoj	64	23	36%
<b>South</b>			
Rabda	30	4	13%
Palej	62	19	31%
<b>West</b>			
Bagdu	62	38	61%
Chiroda	44	33	75%
Motimarad	62	6	10%
Gadhala	30	2	7%
Vijarkhi	56	15	27%
Zikiyan	32	14	44%
<b>Total</b>	<b>1024</b>	<b>303</b>	<b>30%</b>

**Zone Wise Energy Sent and Consumed (11 kV and below) in the State for the Year 2000-01**

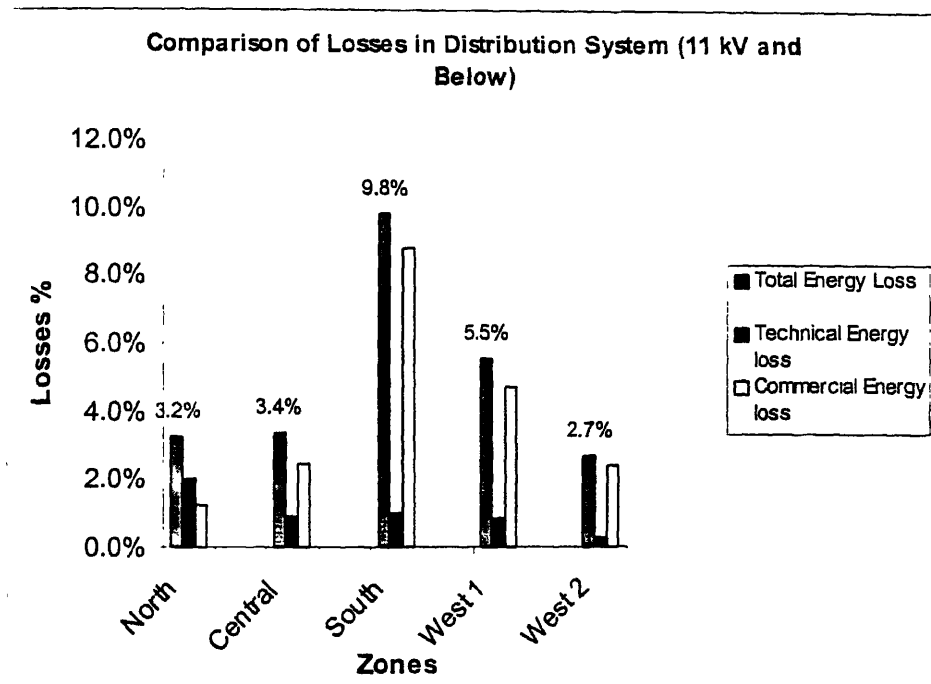
Zones	Energy Sent	Energy Billed	Agricultural Consumption	Total Consumption
North	10121	2163	6647	8810
Central	4026	1733	925	2658
South	5917	1011	919	1930
West 1	6386	1672	2465	4137
West 2	4384	1408	1881	3289
<b>Total</b>	<b>30834</b>	<b>7987</b>	<b>12837</b>	<b>20824</b>

**Zone Wise Distribution (11 kV and below) Energy losses in the State for the Year 2000-01**

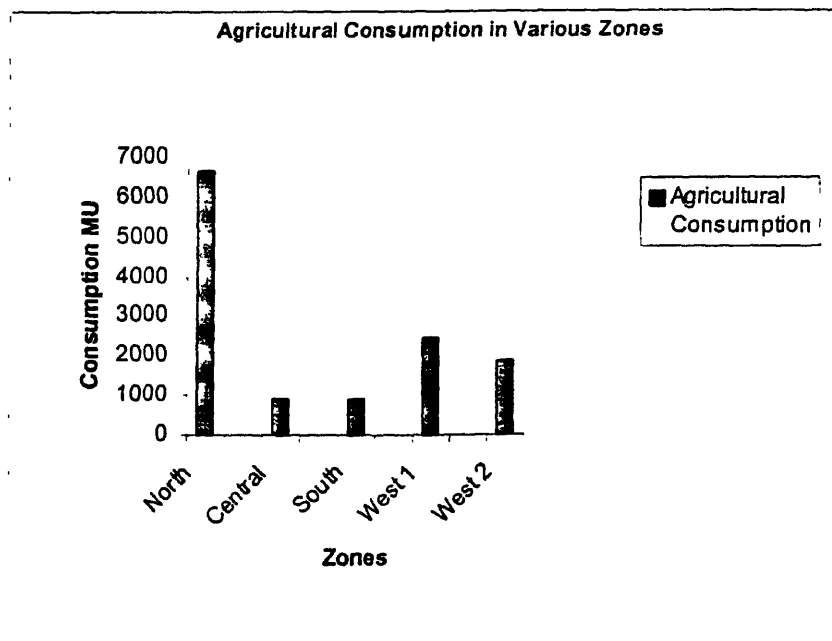
Zones	Total Energy Loss	Technical Energy loss	Commercial Energy loss
North	1311	812	499
Central	1368	358	1010
South	3987	406	3581
West 1	2249	335	1914
West 2	1095	124	971
<b>Total</b>	<b>10010</b>	<b>2035</b>	<b>7975</b>

**Zone Wise Energy Sent and Consumed (including the EHT) in the State for the Year 2000-01**

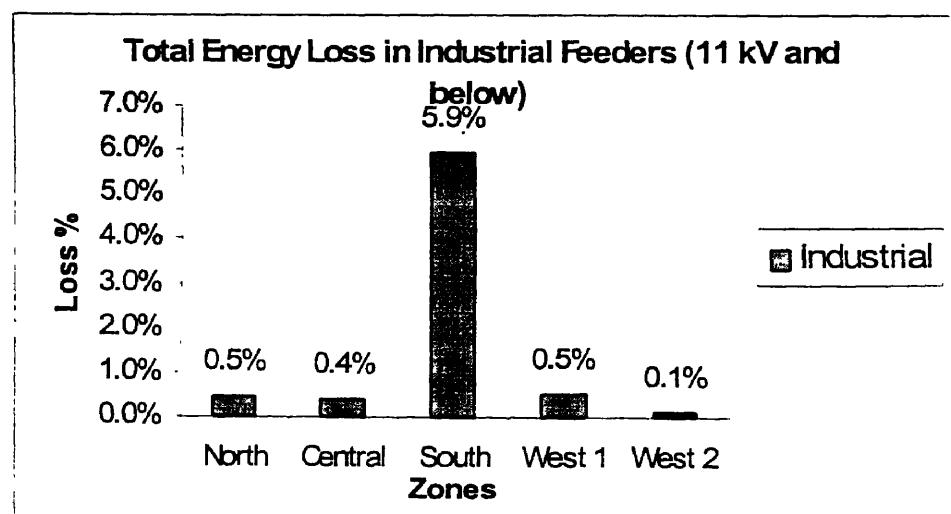
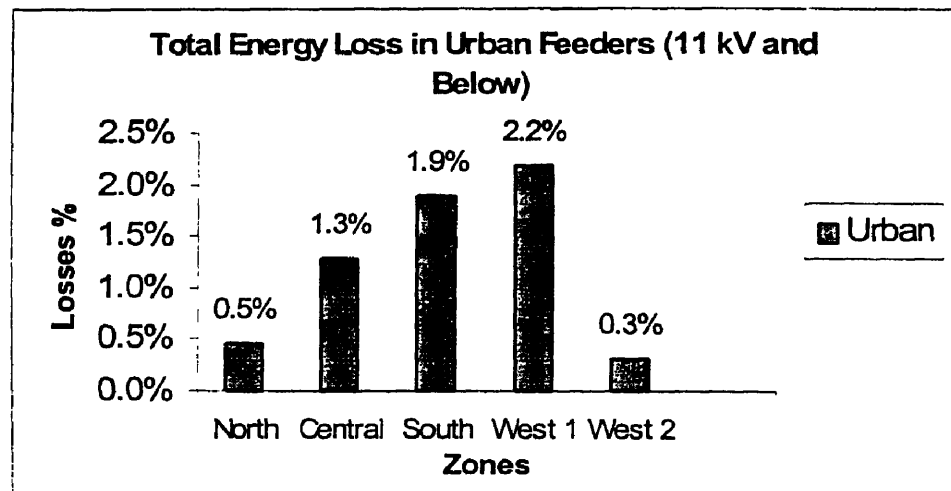
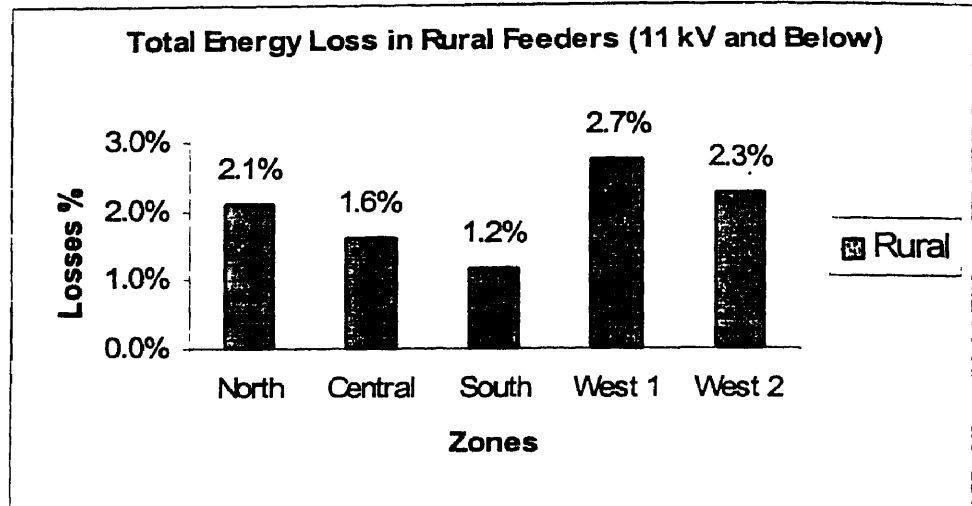
Zones	Energy Sent			Total Sent	Energy Billed		Total Billed	Agricultural Consumption	Total Consumption
	11 kV and Below	EHT Feeders	Losses in 400, 220 kV		11 kV and Below	EHT Feeders			
North	10121	853	560	11534	2163	853	3016	6647	9663
Central	4026	1204	223	5453	1733	1204	2937	925	3862
South	5917	5654	327	11898	1011	5654	6665	919	7584
West 1	6368	211	352	6931	1672	211	1883	2465	4348
West 2	4384	135	241	4760	1408	135	1543	1881	3424
<b>Total</b>	<b>30817</b>	<b>8057</b>	<b>1704</b>	<b>40576</b>	<b>7987</b>	<b>8057</b>	<b>16077</b>	<b>12837</b>	<b>28881</b>



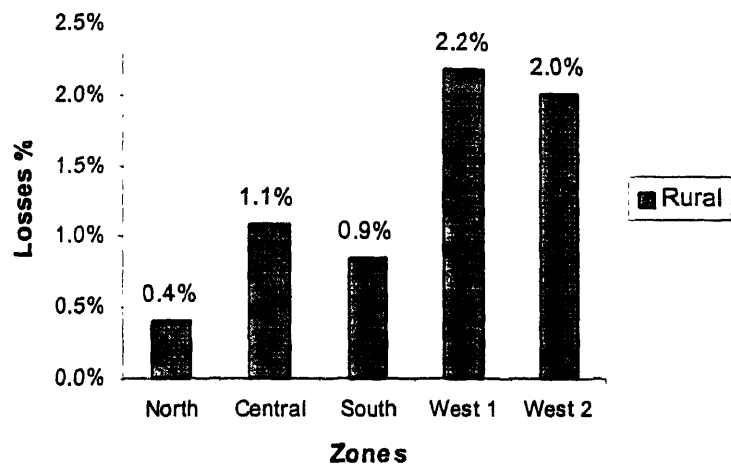
Graph: Comparison of Losses in Distribution System (11 kV and Below)







**Total Commercial Losses in Rural Feeders**



**Total Commercial Losses in Urban Feeders**

